



Railway Age

Vol. 83 September 24, 1927 No. 13

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Railway Age

Vol. 83, No. 13

September 24, 1927

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Seaports and Car Miles

INVARIABLELY, in a comparison of car mile performances, those railways serving seaports of any size make a relatively poor showing. This is easily explainable in most instances, because cars have a way of accumulating at seaports and remaining there for long periods, despite all the railways can do. Manifestly, with a thousand or more cars standing idle in the terminals at the ports, the average miles per car per day will be adversely affected. This is particularly true of the coaling ports in the vicinity of New York, where thousands of cars are held constantly awaiting the whims of the coal jobbers, whose release of cars is controlled very largely by the vagaries of the market. The unreliable schedules of tramp steamers also play an important part in aggravating the situation. Short of completely disrupting the coal and shipping trade, there is comparatively little the railways can do to effect prompt unloading of these cars. They can and do urge upon the consignees the necessity of prompt unloading, but usually this has met with little response. All they can do then is to collect demurrage in insignificant amounts as contrasted with the resulting operating losses made necessary by holding these cars idle. There is, however, something that the railways can and should do to make a bad situation somewhat better. Once the cars have been unloaded and released, they should be moved out promptly so as to be put in revenue service at the earliest possible moment. The Lehigh Valley, to cite one example, schedules its trains of empties from the seaboard and the movement of these trains is watched just as carefully as if they carried manifest freight. In this way, this road manages to offset to some extent the losses caused by idle cars standing around in ports for long periods. It is a vexing problem which all railways concerned should study to find means of solving as far as possible.

Who Makes the Smoke?

SOME interesting figures were obtained by the St. Louis, Mo., section of the American Society of Mechanical Engineers from a smoke survey made during the past heating season, November to April, inclusive. The survey showed that the railroads consumed 417,200 tons of fuel within the city limits and suburbs of St. Louis as compared to 1,422,000 tons for industrial power plants and 520,000 tons for the ceramic industry. Office buildings, warehouses, hotels and large heating plants were a close fourth, consuming 400,000 tons of fuel. In East St. Louis and Tri-Cities industrial power plants used 1,739,000 tons of fuel and the railroads 509,900 tons. The committee found it possible from the data obtained to fix the relative responsibility of each class of smoke producer in relation to the total smoke produced. Taking the east side of the river, including the city

proper and suburbs, the division of smoke was found to be as follows: industrial smoke, 63 per cent; heating smoke, 26 per cent, and railroad smoke, 11 per cent. On the west side of the river, however, the division of smoke was found to be: industrial smoke, 50 per cent; heating smoke, 42 per cent, and railroad smoke only 8 per cent. This percentage of railroad smoke was also obtained in the final recapitulation for the whole territory and the same figure, 8 per cent, was also obtained for two- and four-family flats, stores, garages and small heating plants. The report states that the most smoke from the railroads was produced from locomotives standing on side tracks or in yards. It also points out that enginehouses are bad offenders and that smoke washers should be installed to eliminate the smoke. It is a satisfaction to know that the railroads are not relatively as big producers of smoke as some city administrations would have us believe.

The Fair of the Iron Horse Opens Today at Halethorpe

TODAY, September 24, at Halethorpe, near Baltimore, the Baltimore & Ohio's "Fair of the Iron Horse" opens. It is an event of genuine importance to railroad men and to the industry they serve. Psychologists join with common sense in telling us that human beings usually are acutely susceptible to visual impressions—to see a thing is more impressive than merely to hear about it. That being true, it follows that the history of transportation presented to the eye must be highly effective in conveying the railroad's story to the visitor at the "Fair of the Iron Horse." That those responsible for bringing the pageant and exhibition into being were guided by scientific methods in their planning there can be no doubt. Edward Hungerford, the director of the exposition, expressed the point of view somewhat as follows: A picture appeals to a larger number of people than a speech; color improves the attractiveness of a picture; a working model, throwing scenery and objects into proper perspective, attracts a larger audience than a picture; and, finally, an object itself, placed as nearly as possible in its proper surroundings, draws a larger following than any of these. This is the attitude which, quite plainly, has determined the nature of the exposition at Halethorpe. Wherever possible, each step in transportation's development has been portrayed by an actual working example—scores of actual locomotives and cars moving in chronological order before the spectator. Where the presentation of actual objects has not been feasible, representations in the form of models and tableaux have been used. There are some pictures. Speeches are totally absent. Men who are close to railroading, and who do not need to be "sold" on its achievement and importance, will find the exposition of great interest. The general

public, we believe, will receive from it a message on railroading which perhaps in another form would never reach home. The "Fair of the Iron Horse," therefore, is not a Baltimore & Ohio affair alone, but a spectacle which should interest, and, in the long run, materially benefit other railroads as well. An article giving details of the nature and scope of the fair appears on another page of this issue.

Prices of Railway Stocks

THE present high general level of prices of railway and industrial stocks is due less to the net earnings being made by the industries and railways than to the extraordinary large volume of capital seeking investment and the consequent prevailing low rates of interest. The railways were doing better financially a year ago than they are now, and yet the prices of the stocks of most of them are much higher now than they were then. It still remains true, however, that past, present and prospective earnings are not only a very important factor in determining the general level of security prices, but also the most important influence in causing the price of the stock of a company to be high or low as compared with the prices of the stocks of other companies.

This could not be better illustrated than by the recent range of prices of railroad common stocks. Some persons apparently believe that the market prices of all railway stocks are high and that almost any railway could now raise capital by selling its stock to the public. There are, however, wide differences in the returns being earned by different railways and groups of railways, and these are clearly reflected in the market prices of their stocks. The common stocks of most railways have a par value of \$100. The par of some is \$50, and some have no par value. For the purpose of this comparison the prices of all have been equated on the basis of a par value of \$100. On a recent day when the general level of prices was about the highest that has been reached, the average price of 50 railroad common stocks on the New York Stock Exchange was \$113. This included the stocks of all the principal railways. The average price of the stocks of 20 railways in the eastern district was \$138; of 8 railways in the southern district, \$139; and of 21 railways in the western district, \$81. It will be seen that the stocks of western railways were selling at an average of about \$57 a share below, or for about 41 per cent less than the stocks of the eastern and southern railways. Of the 21 western railways included in this calculation, the stocks of only seven—Santa Fe, Rock Island, Great Northern, New Orleans, Texas & Mexico, St. Louis-San Francisco, Southern Pacific and Union Pacific—were selling over \$100 a share, and those of only 11 were selling above \$50 a share, while those of eight were selling for \$37½ to \$48 a share. Of course, the prices of the stocks of western railways are so much lower than those of other railways because the net return they have been allowed to earn has been, and still is, so much less than the so-called "fair-return."

There are numerous railways in the country which, under the conditions that recently have prevailed, could raise capital by the sale of stock, but of these not more than four or five are western lines. The high prices of the stocks of the Santa Fe, Union Pacific and Southern Pacific are frequently cited in the west to show the prosperity of western railways, but the fact that even in the present extraordinary market three-fourths of the large western railways could not raise capital by the sale of their stock is much better evidence of the western railway situation than the high prices of a few stocks.

Railroad Shop Apprenticeship

IT is doubtful whether, with the exception of two occasions when railroad shop apprenticeship was discussed a score or more years ago by the Master Mechanics' Association, any other discussion of this subject has been so productive in the development of valuable information as the one which took place at the meeting of the New York Railroad Club last week. The address, which was made by T. C. Gray, supervisor of apprentices of the Missouri-Kansas-Texas, indicated the extent to which the mechanical department of that railroad has broken away from what are generally recognized as the standard practices adopted by a comparatively small number of railroads which have acted as pioneers in the introduction of modern apprenticeship methods. Representatives of the Baltimore & Ohio went a step further in telling of the new methods now in vogue on that railroad, which represent a still more radical breaking away from these practices. Other speakers emphasized some of the latent possibilities for constructive service which may be awakened if the young men are properly inspired and coached.

Naturally there was some comment on the application of intelligence tests which have been experimented with on the Missouri-Kansas-Texas. An unbiased listener might well conclude that a large factor in the success of such tests lies in the intelligence of the person who administers them. Mr. Gray, for instance, told how a representative of the Kansas State Teachers College had applied such tests to 66 of the apprentices. This representative did not know the young men and had never been associated with them in any manner. At the same time that these tests were being made, a careful study was made by the apprentice department and the foremen, of the shop and school ability of the young men. It is significant that when the two sets of ratings were finally compared, they proved to be almost identical, differing not more than possibly five per cent. This suggested that such tests could be utilized to advantage in facilitating the selection of the right sort of young men for railroad shop service. That it is necessary to use such tests carefully, however, was indicated by another speaker, who cited a case where tests made by a so-called expert on intelligence tests did not at all agree with observations made by supervisors who were intimately acquainted with the work of the young men who were tested.

Another practice advocated by Mr. Gray, and which undoubtedly will be the subject of more or less controversy among apprentice supervisors, is insistence upon the department foremen taking over the responsibility for educating the apprentices on shop practices and methods, rather than using shop apprentice instructors for this purpose. The Missouri-Kansas-Texas practice is apparently predicated upon the growing belief in industrial circles that a successful foreman or supervisor must have ability as an educator and that he is primarily responsible for instructing his subordinates as to how their tasks should be performed. Those who oppose Mr. Gary's point of view will undoubtedly point to the fact that few of the railroad shop foremen and supervisors fully recognize their responsibility to the apprentices in this respect and that until they do so and their work is reorganized to assure sufficient time for this purpose, special shop apprentice instructors will be necessary if the best results are to be obtained. Apparently it will take a considerable amount of time and effort to bring these two opposite points of view into any degree of harmony. A large factor in the success of the M.-K.-T. experiment undoubtedly lies in the fact that apprentice

boards at each of the shops, composed of the shop superintendent and the department foremen, closely follow the progress of each apprentice and take an active part in the promotion and direction of apprenticeship activities.

Another radical departure of the M.-K.-T. from the usual practice is the fact that very little attention is given to mechanical drawing in the school room, but stress is placed upon shop sketching. Much effort is taken to co-ordinate the school and shop work of the apprentices and an unusual amount of research and study has been given to determining exactly what information and skill must be possessed by the successful worker in each of the crafts. Doubtless other railroads have made similar checks, but the lack of special study courses for some crafts on many roads would seem to indicate that no great amount of research has been done along these lines.

That great possibilities for constructive performance on the part of the apprentices, both individually and as a group, lie dormant, must be inferred from the rather startling testimony on the part of some of the supervisors as to the accomplishments of the apprentices at some points, and particularly where they have organized clubs. It was the apprentices, for instance, at the West Springfield shops of the Boston & Albany, that started a Christmas savings fund, which in its third year, ended last December, distributed over \$40,000; this represents, of course, the savings of the entire group of workers at West Springfield, and not the apprentices alone. The movement, however, was started and sold to the employees at West Springfield by the shop apprentices. It is quite probable, also, that the supervisors' club at that point, which has been giving an excellent account of itself during the past two or three years, was inspired by activities among the apprentices which were suggested by the attendance of some of their number at one of the younger railroad men's conferences.

It is unfortunate that the time limitations of the railroad club meeting made it necessary to confine the discussion to a comparatively brief period. The results, however, indicate clearly the value of such discussions as clearing houses for advance practices and important experiments in the field of railroad shop apprenticeship.

Who Should Tip the Porter?

THE old question of the tip to the Pullman porter has again been raised in a complaint filed with the Interstate Commerce Commission by the Brotherhood of Sleeping Car Porters—in other words, from the standpoint of the employee who would like to have the amount of his tips regularized and guaranteed by a proportionate increase in his wages, but who would probably continue to expect some increment in the form of tips even if the commission should follow the suggestion of the petition and require the company not to permit tipping. The petition, however, is based on a complaint of violation of the interstate commerce act, as a discrimination between passengers, some of whom have their shoes "shined," their clothes brushed and their bags carried, in addition to the service which the company holds itself out to furnish and which is necessary to all, for a "greater or less compensation" than is paid by others.

The petition does not purport to represent the views of the passengers, some of whom would be much more reluctant than others to pay an additional tariff rate for their "shine" or for the many other little personal services of which some people seem to require so many

more than others. Therefore, it would appear, the issue has not been exactly squarely joined. If the Pullman Company is to be expected to render these personal services, in addition to those for which it now pays wages and receives rates, it would have to pay higher wages and should naturally expect a higher compensation. Of course, there are always those who would like to get something for nothing and have the company shine their shoes without extra charge, just as there are doubtless many porters who would rather have the company pay them a fixed tip monthly than exert themselves to render the kind of service that ordinarily elicits a greater or less gratuity. It is commonly said that it is "necessary" or that there is "pressure" upon the passengers to give tips, but it is well known that some people who do not desire or do not want to pay for any special service find ways of escaping the undue solicitude on the part of the porter which is supposed to represent the "pressure" referred to. One way is to keep the shoes back out of sight, instead of obviously setting them forward to be attended to, or to retain a firm grip on the luggage.

The whole question arises from confusion as to the service for which the Pullman Company is now paid and for which it pays its employees. It pays them for making up berths, for example, but it is no more the business of the company to shine shoes, brush clothes or carry luggage than it is of a hotel company to render the same service. If these things are regarded as part of the service to be expected of the company, naturally it should be represented by an addition to the present tariff charge for its service.

Would a self-respecting organization truly representing the American traveling public ask even the Pullman Company for a \$7,000,000 tip?

The Constitution and the Country's Railways

THE 140th anniversary of the signing of the federal constitution was celebrated in meetings throughout the country on September 17. Because of the plainly growing need for more public knowledge of the provisions, spirit and purposes of the constitution this date has been selected by patriotic bodies as "Constitution Day." Those who are especially interested in the railway problem have an especial reason for wishing success to the efforts being made in behalf of a better public understanding of the constitution and of what must be done to give effect to its purposes.

The principal provisions of the constitution which protect private property from unjust treatment are those prohibiting the taking of it for public use without due process of law and just compensation. The courts long since upheld the right and power of the state and national governments to regulate the operation and rates of concerns engaged in rendering a public service. About one-third of a century ago the way in which railway rates were being regulated raised the question of the extent to which such regulation could go without resulting in the unconstitutional taking of railway property without just compensation. It was soon held by the federal courts that this question was one which the courts must determine.

The principle involved was the same as that in cases arising from the exercise of the power of eminent domain. "If the public was seeking to take title to the railroads by condemnation," said Justice Brewer in an opinion rendered in 1894, "the present value of the property and not the cost is that which it would have

to pay." Soon afterward, in another case, another federal judge, after quoting this statement of Justice Brewer, added: "It follows, I think, that where the public undertakes to reduce the rates charged for the use of such property it is its present value and not its cost that must be taken as a basis upon which to fix reasonable and just rates." In other words, because of privileges granted them and the nature of their service, the railroads were subject to regulation, but fundamentally their property rights were the same as those of other owners of property. As any owner of property, if the government took his property by condemnation, was entitled to be paid its value at the time it was taken regardless of what it had cost him, so the present value of the railways must be taken as the basis for the regulation of their rates.

Out of these decisions of the federal courts grew up the doctrine and practice of valuation of railroads and public utilities as the basis for the regulation of rates. It is now often assumed that the principle of basing rates on valuations of railway and public utility property always has been advocated and applied for the protection of actual investment. This is not correct. One of the earliest advocates of the present value of railway property rather than actual investment as the basis for regulation of rates was William J. Bryan. He was one of the counsel for the state of Nebraska in the Nebraska rate case (*Smythe vs. Ames*). This case was tried after wages and prices had sharply declined following the panic of 1893, and Mr. Bryan advocated present value as the basis of regulation, and cost of reproduction as a measure of present value, because he believed the actual investment exceeded the cost of reproduction. In numerous early cases the courts held that the present value should be used as the basis of regulation even though it should be found to be less than the actual investment. Evidence regarding actual investment, cost of reproduction and other factors was to be considered, but it was present value, and not cost, that must be used as the basis for regulation.

A Principle "No Longer Open to Dispute"

By 1903 the doctrine of "present value" was so well established that the Supreme Court of the United States said in one case: "It is no longer open to dispute that under the constitution 'what the company is entitled to demand in order that it may have just compensation is a fair return upon the reasonable value of the property at the time it is being used for the public.'" In another case in 1909 the court said: "The value of the property is to be determined as of the time when the inquiry is made regarding the rates. If the property which legally enters into the consideration of the question of rates has increased in value since it was acquired, the company is entitled to the benefits of such increase."

It was while this principle was being established by the Supreme Court in repeated decisions that the Interstate Commerce Commission was seeking from Congress authority to make a valuation of all the railroads. It was after it had been firmly established as the law of the land that the La Follette law was passed in 1913 directing the Commission to make a valuation. Following the great advances in the cost of construction arising from changes in wages and prices due to the war, the Supreme Court in numerous decisions in public utility cases has placed increased emphasis upon present value as the basis of rate regulation and upon the present cost of reproduction as a factor in determining present value. It was after all these developments, covering a period of a third of a century, that

the Interstate Commerce Commission held, in effect, in the O'Fallon case that not the present value of the railways, but the investment in them as nearly as it is ascertainable, less a large deduction for depreciation, is the basis upon which their rates should be regulated and upon which they should be allowed to earn a "fair return." The only exception made by it is as to railway land, which it proposes to appraise at the value of adjacent land.

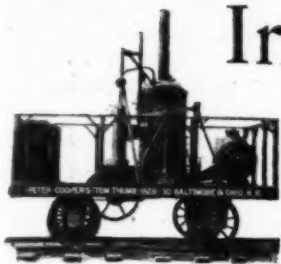
Have Constitutional Rights Changed?

The present value of railway property, and the use of cost of reproduction as a measure of it, was advocated by anti-railway protagonists in early cases because it was believed that this would restrict the railways to less than the so-called "fair return" on their actual investment. The actual prudent investment has been since the war advocated by them because on the basis of present value, estimated with effective allowance for present-day costs, the railways would be allowed to earn the so-called "fair return" on more than the actual number of dollars that have been invested in them. But has the depreciation in the value of money since before the war, which is reflected in universal increases in wages and prices, changed the meaning of the provisions of the federal constitution? Has it so changed it that if the government were to condemn a farmer's land for a military reservation or land and buildings in a city for the erection of a post office building, it would not have to pay their present value for them, but only the number of dollars they cost their owners before the war? Every court would hold that the constitutional right of the owners of these and other kinds of property to be paid its present value is the same as it was before the war.

Is it possible, then, that while the increases in wages, prices and nominal or actual values that have occurred since before the war have not changed the constitutional rights of the owners of other property, they have changed the constitutional rights of the owners of railroad property? The Interstate Commerce Commission by its decision in the O'Fallon case, has asked the Supreme Court to so hold and thus reverse an unbroken series of decisions made by it over a period of thirty-five years. It hardly seems probable the court will do so.

A Remarkable Situation

The situation presented is a very remarkable and significant one. There are involved in the regulation of railways constitutional questions as to property rights, and also questions of public policy. Under our system of government it is exclusively the function of the courts to settle constitutional questions, and the duty of the legislative and executive branches of the government in carrying out public policies to recognize constitutional property rights as determined by the courts. To the Interstate Commerce Commission has been delegated the function of carrying out a public policy in the regulation of railways, but, instead of trying to so make a valuation and to so regulate rates as, first, to accord to the railways the minimum to which the courts have held they are constitutionally entitled, and, secondly, to give them whatever in excess of this may be sound public policy, the Commission has chosen to appear as the foremost protagonist for a decision by the Supreme Court which would greatly change the property rights of the railways by making the minimum return to which they can be restricted much less than it has ever been held it could be made. Is it surprising, then, that there are those who do not believe the Commission, as at present constituted, is a fair and impartial body?



Iron Horse Fair Opens Today

B. & O. centenary exhibition and pageant, September 24 to October 12, portrays railroad achievement—Everybody invited

THE "Fair of the Iron Horse," the Baltimore & Ohio's centenary exhibition and pageant, opens today, September 24, at Halethorpe, Md., a suburb about seven miles from Baltimore, and will continue until October 12, the prior closing date of October 8 having been advanced. This fair is not a one-railroad celebration, depicting Baltimore & Ohio history to the exclusion of that of any other road. Nor are its guests restricted to its own employees. Rather the occasion is one at which the railroad proposes to play host to everyone who cares to avail himself of the opportunity. Naturally, outstanding events in the history of the Baltimore & Ohio are emphasized but the show is carried out with such completeness, with other railroads coming forward to fortify and strengthen the program where necessary, that the onlooker does not see unfold before him the story of just one company, the Baltimore & Ohio, but in a larger sense, that of all railroad development and, indeed, of other forms of transportation as well.

The nature of the spectacle lends itself to division into two distinct parts, viz.:

1. The stationary exhibits.
2. The moving pageant.

The grounds are opened at 10 a. m. each day except Sunday, when they are opened at 2 p. m. The pageant, which will be given each day except Sunday and Monday, starts promptly at 2 p. m. Visitors who arrive at the opening hour or shortly thereafter (on Tuesdays to Saturdays inclusive) have ample opportunity to make a reasonably complete inspection of the standing exhibits before the pageant starts. When the pageant ends—4 p. m. according to schedule—the visitor who arrived in the morning will have had an opportunity to see the sights about as thoroughly as the average person will desire. In other words, for the average visitor one day will suffice for the show, although some careful students



of transportation history may find it expedient to make several visits.

An accompanying diagram shows in graphic form the layout of the grounds and the position of the important exhibits, not including, however, the very important ones which are housed in the buildings on the grounds. Some of these outside exhibits are still. Others will move in the pageant.

Development of the Iron Horse

The central building of the exhibition is the Hall of Transportation, which is 502 ft. long and 60 ft. wide, of brick and steel construction. In this building the largest exhibit is that of 31 full-size models of early locomotives or originals. These fall chronologically into four groups. First, those prior to the nineteenth century; second, those built from 1803 to 1814, inclusive, preceding the definite establishment of the steam railroad as an instrument of public service; third, those built from 1826 to 1837, inclusive, which, with one or two exceptions, actually rendered successful service on steam railroads, and fourth, Ross Winans' "Camel Back" of 1848.

In the first group are Newton's "idea," put forward in 1680, and, although it was never actually developed, it is here concretely illustrated, and the famous "Cugnot," the wild steering of which on the streets of Paris in 1769 is said to have led to the confiscation of the machine. In the second group are seven locomotives, the first of which was the work of Captain Richard Trevithick in 1803, which is credited with being the first locomotive in the world to run on rails; and the last of which is the "Blucher," the first locomotive built by



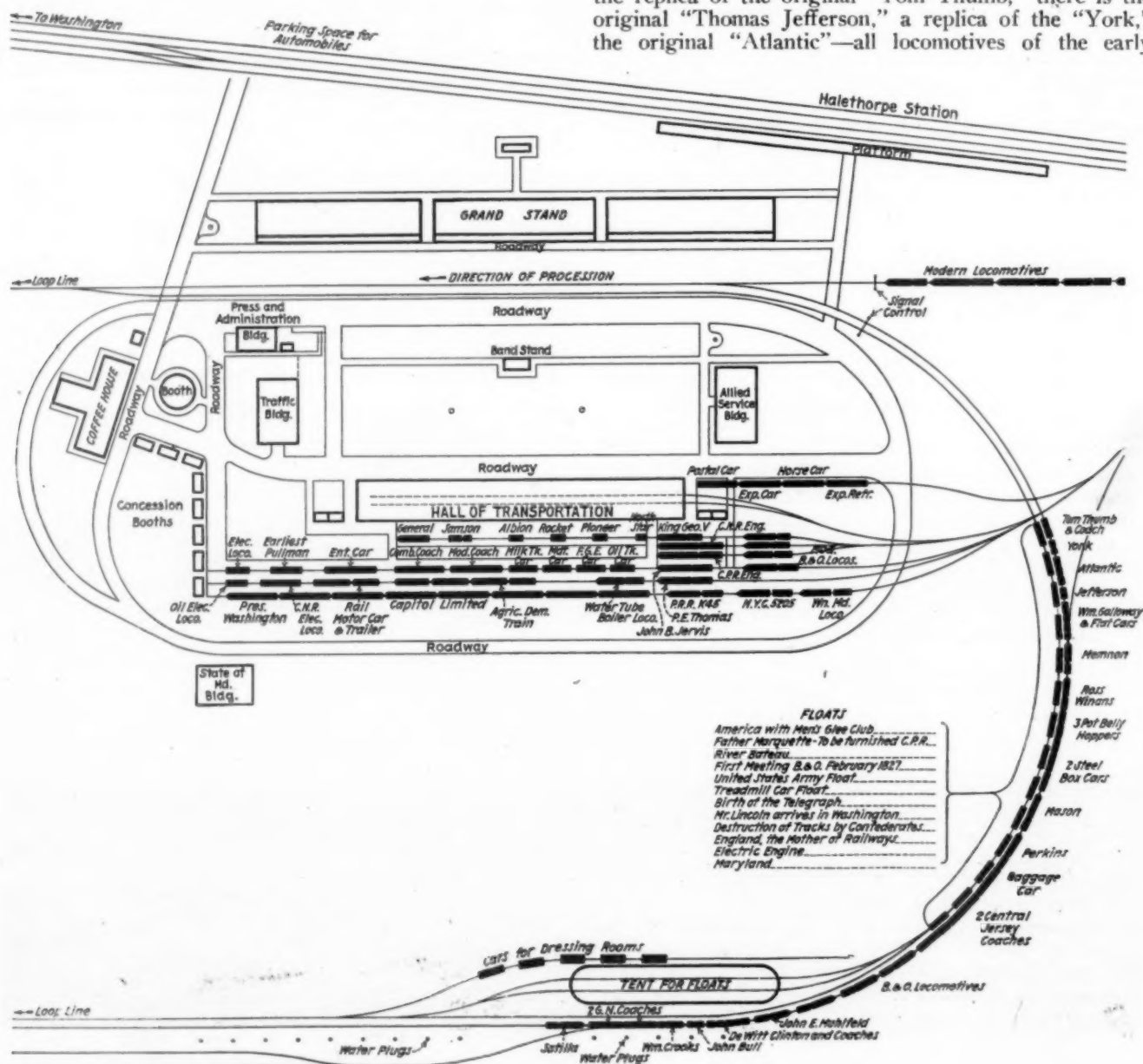
Exhibition Grounds Viewed from Platform at Halethorpe Station

George Stephenson while the inventor was still primarily interested in coal mine operation. In the third group are 21 locomotives, with one exception all of English or American origin. The "Seguin," the oldest of the group, built in France in 1826, is the first locomotive in the world embodying the tubular principle of boiler construction. Among the models of American locomotives are those of the famous "Stourbridge Lion" (1829), the first locomotives to run in America, imported from England by the Delaware & Hudson Canal Company; Peter Cooper's "Tom Thumb" (1829), the first American-built locomotive; the "Best Friend" (1830), which was the first American-built locomotive to operate successfully in actual service; the "York" (1831), winner of the Baltimore & Ohio trials; "Old Ironsides" (1832), Matthias Baldwin's first locomotive; the Jervis "Experiment" (1837), in which was made the first application of equalizing beams, the principle of which forms so important a part of the suspension of the modern locomotive. Among the English models are the world-famous "Rocket" (1829), the successful performance of which at the Rainhill trials of the Liverpool & Manchester won George Stephenson the title of the Father of the Locomotive.

In the Winans "Camel Back" of 1848, something of the trend in the direction of which American motive power was to increase in size and capacity is evident, although its exact form is almost as curious today as that of the earlier types.

Other locomotives, models of which are included in the exhibit, have acquired less popular fame than those mentioned, but each will be found to contribute vividly to a visualization of the variety of ideas of the early engineers and designers who took part in making a success of the early operation of railroads with steam motive power.

In addition to these full size models, which have been painstakingly reproduced, the outside track exhibits hold much of interest to the locomotive antiquarian in the form of early locomotives which have been preserved or reproduced according to the original design, and many of which will be operated under their own steam in the pageant. Among these locomotives, the largest number from a single source belong to the Baltimore & Ohio, the preservation of several early originals being perhaps due to the fact that in its century of existence the Baltimore & Ohio has had an unbroken corporate history under the original charter. Beside the replica of the original "Tom Thumb," there is the original "Thomas Jefferson," a replica of the "York," the original "Atlantic"—all locomotives of the early

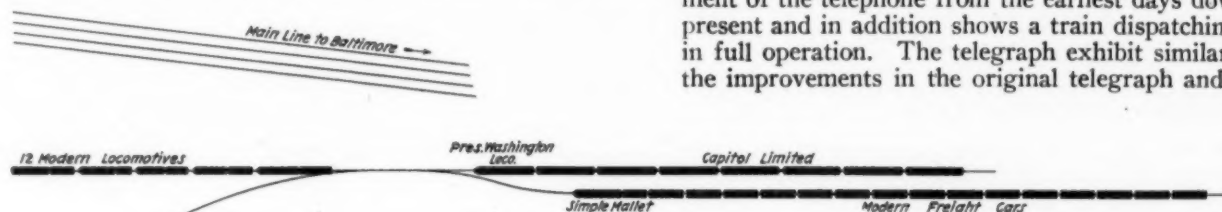


Plan of the Exposition at Halethorpe, Showing Pageant Array

thirties—as well as the first locomotives on the B. & O. to have a horizontal boiler. A number of other old locomotives, restored and decorated in accordance with the original design, represent the typical motive power at several later periods in the history of the road. The first Mallet locomotive built in America which was placed in service on the B. & O. in 1904 while John E. Muhlfeld was in charge of the motive power department, will also be seen in the pageant.

The exhibit, however, is not confined to early Baltimore & Ohio equipment. The "John Bull," the first locomotive to be operated over the Camden & Amboy has been taken from its resting place at the Smithsonian Institution, Washington, D. C., and overhauled by the Pennsylvania so that it may be operated under its own steam. The first two locomotives to be operated on rails in Canada will also be on exhibition, although not in operation, as will also the famous "General" of the Western & Atlantic which has been brought to Baltimore from its permanent resting place at Chattanooga, and several other historic locomotives of other railroads.

An interesting feature of the exhibit is the contribution of the Great Western of England, which has sent to Baltimore the first of its latest class of passenger locomotives, the "King George V,"* and the "North Star," its first locomotive, built in 1837. This locomotive will be of particular interest to American railroad men in that it was originally built by R. Stephenson & Company of England for the New Orleans Railways in the United States, with a track gage of 5 ft. 6 in. Owing to a



financial crisis, however, the locomotive was left on the hands of the builders and it was later altered to suit the 7-ft. gage originally adopted by the Great Western, and handled the first passenger train out of Paddington Station, London, when the railroad was opened in 1838.

Other Transportation Building Exhibits

Another exhibit in the Hall of Transportation portrays the development in passenger car heating from the old wood-burning stove days down to the present method of vapor heating. Still another shows the development of the air brake and another the use of the automatic stoker.

The signal companies have a complete exhibit showing the development of railway signaling, including a display of modern signal appliances and the car retarder. At one end of the building there is a scenic display showing Harper's Ferry and vicinity, including an exact model of the wooden bridge over the Potomac built in 1836 which was destroyed by Stonewall Jackson in 1861. Arranged along the walls near this display is a historic collection of pictures illustrating in chronological order the evolution of the locomotive on the Baltimore & Ohio, beginning with the four-wheeled sail-car. A section in this hall has been set aside for the display of a historical collection of railroad watches and clocks, showing the development and method of manufacture.

Another notable exhibit in this hall is a panorama in model form, of the Baltimore & Ohio's line from Balti-

* This locomotive was described in the *Railway Age*, August 6, 1927, page 253.

more to Chicago. The scenery is faithfully reproduced and on the track are model trains which are arranged to give a complete picture of railroad development. To carry out the idea of the passage of time, Baltimore is shown as it was in 1830 and railroad equipment models near the Baltimore end of the display correspond with that date. Proceeding westward they grow more modern until Chicago is reached, where the latest types of equipment are shown. In addition to portraying rolling stock development, this display likewise shows chronologically the evolution of the railway bridge.

There is in this building an exhibit of a ballast distributor called "The Mole," designed by a Baltimore & Ohio track supervisor. Another shows the development of transportation from track workers, starting with the hand car used in the Civil War period, followed by the modern pump car and the gasoline motor car. Tools used for track work are included, from the early tamping bar down to the modern pneumatic tamping machine. Photographs depicting modern timber preservation methods are shown, as is a rail sawing machine.

In the Allied Service Building

In the Allied Service Building, which is probably the first building the visitor will approach if he comes to Halethorpe by train, there are exhibits by the American Telephone & Telegraph Company, the Western Union Telegraph Company, the American Railway Express Company, the Post Office Department and the steamship lines. The telephone exhibit portrays the development of the telephone from the earliest days down to the present and in addition shows a train dispatching system in full operation. The telegraph exhibit similarly traces the improvements in the original telegraph and shows a

modern cable transmission machine used in overseas communication. The Post Office Department exhibit portrays various methods by which the mails are collected and transmitted and the express exhibit shows the development and methods of this industry.

The various steamship companies are represented by models of well-known ships: The Cunard line by the "Aquitania"; the White Star by the "Majestic"; North German Lloyd by the "Columbus"; the Detroit & Cleveland Steamship Company by the "Greater Detroit"; the Luckenbach Lines by a cargo ship; the Hudson River Day Line by a model of Robert Fulton's "Clermont" and the "Hendrik Hudson"; the Merchants & Miners Transportation Company exhibits its "Ontario" and the Baltimore Steam Packet Company its "State of Maryland." The Chesapeake Steamship Company has a topographical relief model of the territory it serves.

On one wall of this building is a huge map of the Baltimore & Ohio and the territory it serves. The map is of the old style now again becoming popular, portraying an outstanding characteristic of important points—the Statue of Liberty at New York, the Capitol at Washington, etc.

In this building also are shown exhibits of the railroad's relief and welfare activities among its employees.

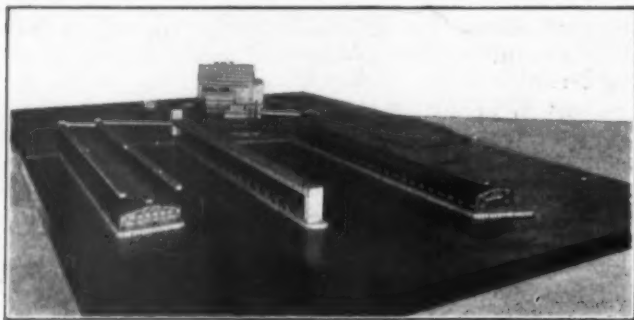
The Evolution of Track and Roadbed

Passing from the Allied Service Building to the Traffic Building, in front of the Transportation Building, the visitor will find the track exhibit, tracing by short sections of each type the development of railroad track

from the beginning down to the present time, beginning with iron straps spiked to wooden stringers or on stone supports, down to the 130-lb. rail of the present day.

Traffic Building Exhibits

In the Traffic Building are models and exhibits showing the co-operative activities of the railroad—the sci-



Model of Locust Point Grain Terminal

tific location of industries, the development of geological resources and agricultural development work.

In the center of the hall there is an elaborate model of the company's Locust Point (Baltimore) tidewater grain elevator and grain handling plant, which shows the transshipment of grain into sea-going vessels.

Other exhibits include those of the Baltimore & Ohio Employees' Magazine and of the freight and passenger departments. There is a complete display of old railroad tickets and time tables and another of baggage and trunks.

Stationary Exhibits

To the rear of the Transportation Building on tracks are a number of stationary exhibits some of which, however, will be taken out to move in the pageant. Among these exhibits are the following:

The first Pullman car, which was operated on the Chicago &

Alton in 1859. Beside it, by way of contrast, is a recent product of the same company—an "entertainment car," equipped with a moving picture projection room, a gymnasium, a barber shop and a library.

Modern refrigerator cars supplied by the Merchants Dispatch and the Fruit Growers Express.

A glass lined tank car for handling milk.

The first two locomotives in Canada, the "Samson" and the "Albion," and the first passenger car ever used in Canada.

The "North Star," the first locomotive of the Great Western Railway of England, reconstructed for the British centenary celebration in 1925.

Modern Canadian locomotives, one from the Canadian National and another from the Canadian Pacific.

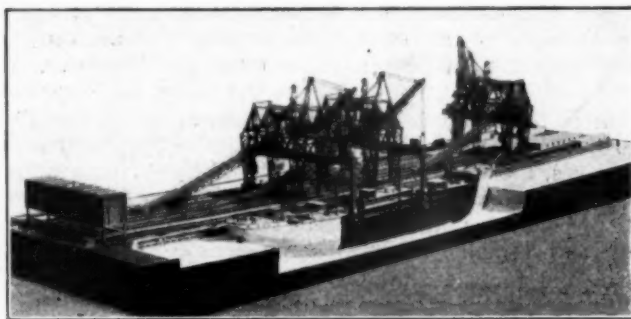
The Cumberland Valley's "Pioneer."

A 60-ton oil-electric locomotive used in switching service.

"The General," the historic Civil War locomotive of the old Western & Atlantic, which was lent by the Nashville, Chattanooga & St. Louis.

Modern locomotives from the Pennsylvania, the New York Central, and the Western Maryland.

A mine car, running on rails which were flanged rather than



Curtis Bay Coal Pier in Miniature

the wheels—antedating by many decades the first attempt at a commercial railway in the modern sense.

The Reading's "Rocket."

An old New England stage coach, owned by Fred Stone, the actor.

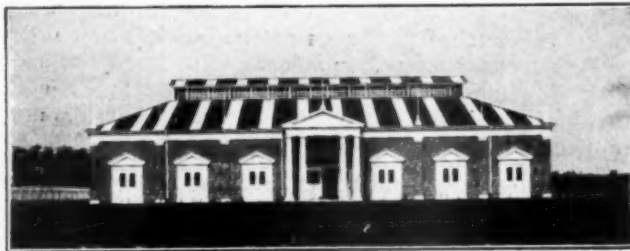
A Washington type stage coach.

An oil tank car.

Several modern Baltimore & Ohio coaches, showing one with individual bucket type seats.



The "George Washington" Tavern

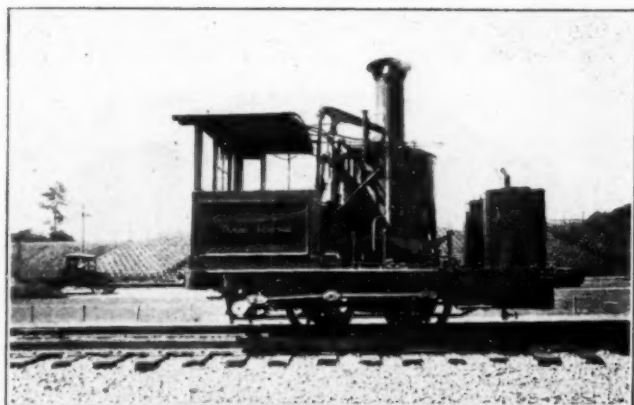


The Allied Services Building

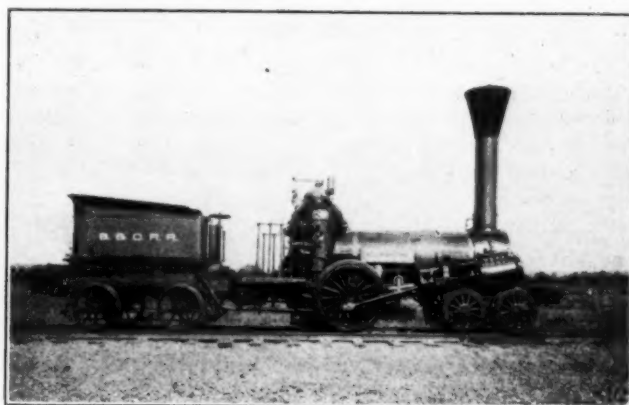


The Hall of Transportation at Halethorpe

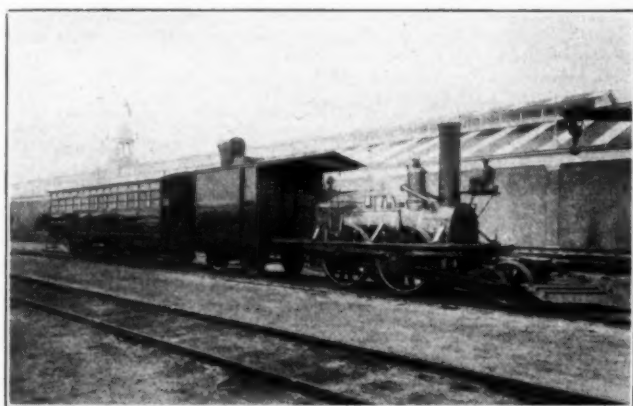
Some Old Timers at Halethorpe



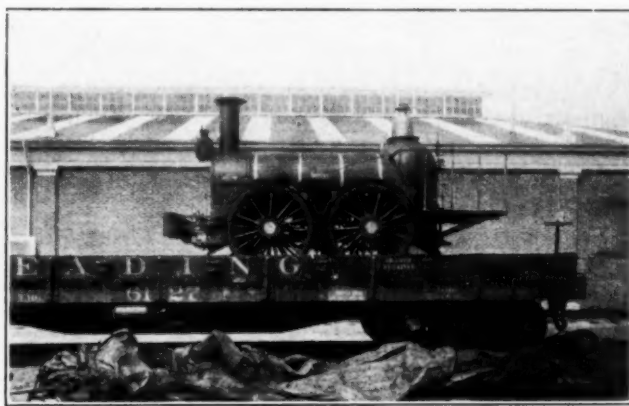
The "Thomas Jefferson"—1836



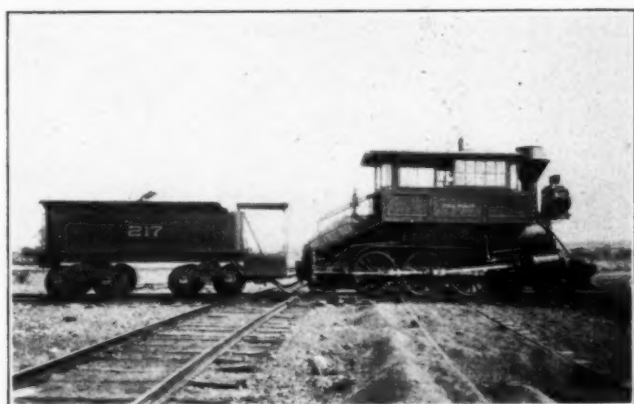
The "William Galloway"—1837



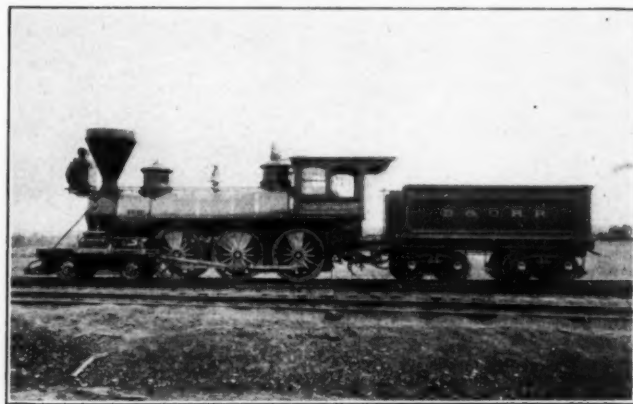
The P. R. R.'s "John Bull"—1831



The Reading's "Rocket"—1838



The "Ross Winans"—1869



The "Thatcher Perkins"—1863



The N. Y. C.'s "De Witt Clinton"—1831

An agricultural demonstration train.
A rail motor car and trailer.

The Pageant

The pageant proper, which begins at 2 p. m., is headed by the Baltimore & Ohio Centenary band of 60 pieces. Following this come the locomotives and cars and the floats. While the following list is not complete, nor does it pretend to give the various units in the order in which they appear, it nevertheless will convey a general idea of the nature of the pageant:

A float called "America," carrying the Baltimore & Ohio Glee Club, a male chorus of 40 voices.

A group of Blackfeet Indians (brought to the exhibition by the Great Northern) with heavily laden pack horses and the primitive "travois."

A float prepared by the Canadian Pacific representing Father Marquette, the famous missionary and explorer, discovering the Mississippi. A double quartette will sing traditional French-Canadian songs.

A float showing old canal transportation.

A Conestoga wagon.

A stage coach representing Henry Clay on his way to the Senate in Washington.

A float showing the meeting of citizens at which the Baltimore & Ohio was organized.

A float showing the laying of the Baltimore & Ohio's cornerstone.

A float showing United States army engineers surveying the road.

A float showing the old horse treadmill car and the sail car. The "Tom Thumb" (the Baltimore & Ohio's first locomotive) running under its own steam on the track.

The "York," the road's second locomotive.

The "Atlantic," another locomotive with an upright boiler, hauling two "Imlay" coaches.

The "Thomas Jefferson," still another locomotive with an upright boiler.

The "William Galloway," the first locomotive with a horizontal boiler.

The "Memnon," a little larger than the Galloway.

The "Ross Winans," the first "camel back" type hauling several old hopper and box cars.

The "Mason" with several old passenger cars.

Several locomotives (1860 to 1900).

The "Muhlfield," the first American Mallet.

The New York Central's "DeWitt Clinton" and train.

The Pennsylvania's "John Bull" and car.

The Great Northern's "William Crooks" and coaches.

Henry Ford's "Satilla" of Civil War days.

A float portraying the birth of the telegraph.

A float showing Abraham Lincoln arriving in Washington over the Baltimore & Ohio for his first inauguration.

A float showing the destruction of the railroad's tracks during the Civil War.

The "King George V," the newest locomotive of the Great Western Railway of England.

The "John B. Jervis," new water tube boiler locomotive of the Delaware & Hudson.

Several types of modern Baltimore & Ohio locomotives.

A freight train including the 32 different types of cars used by the railroad.

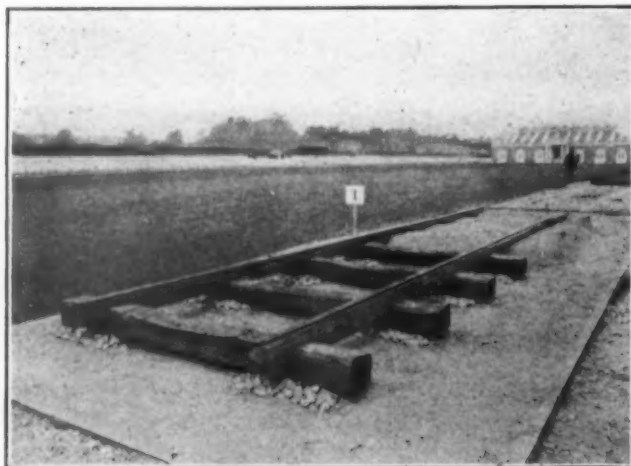
A complete "Capitol Limited," the road's best known passenger train.

A float called "Maryland."

Details Carefully Considered

The railroad has endeavored to overlook no detail which will insure the success of the pageant. On the

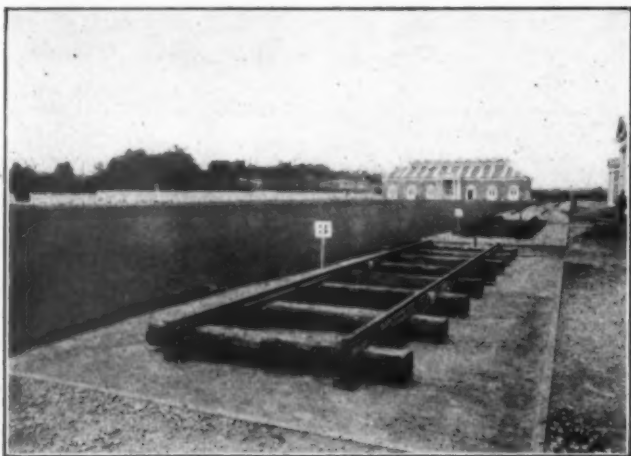
A Part of the Track Exhibit



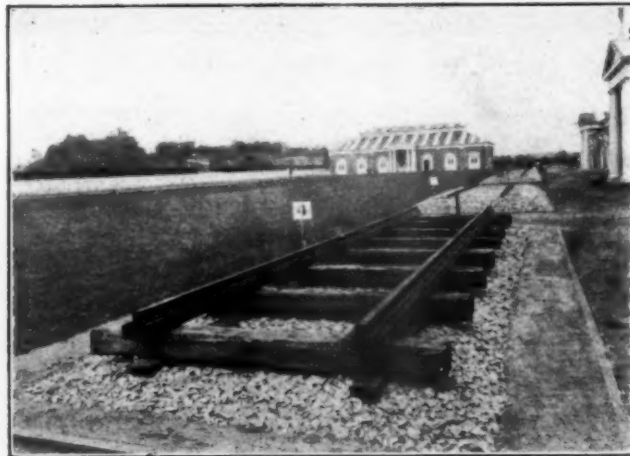
1829-1830



1829-1830

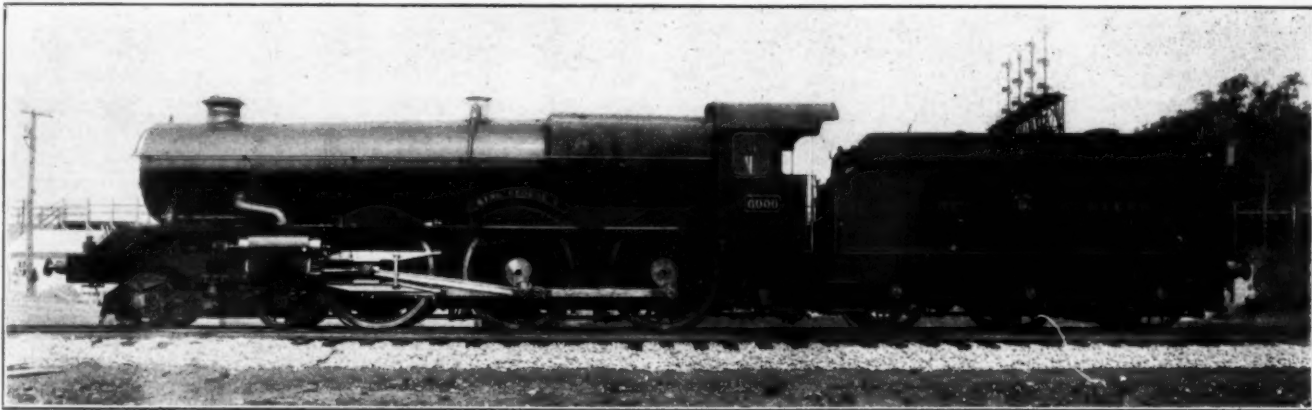


1835-1842

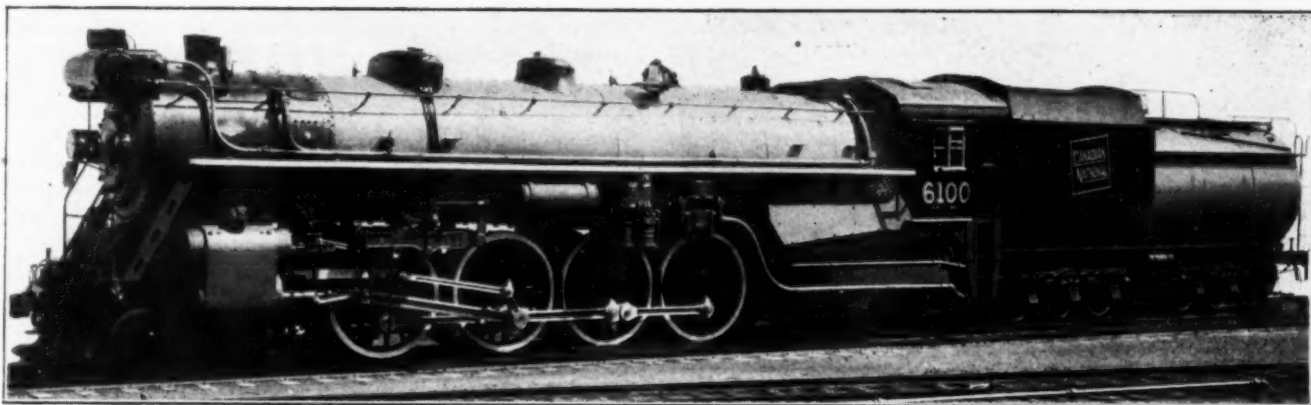


1835-1842

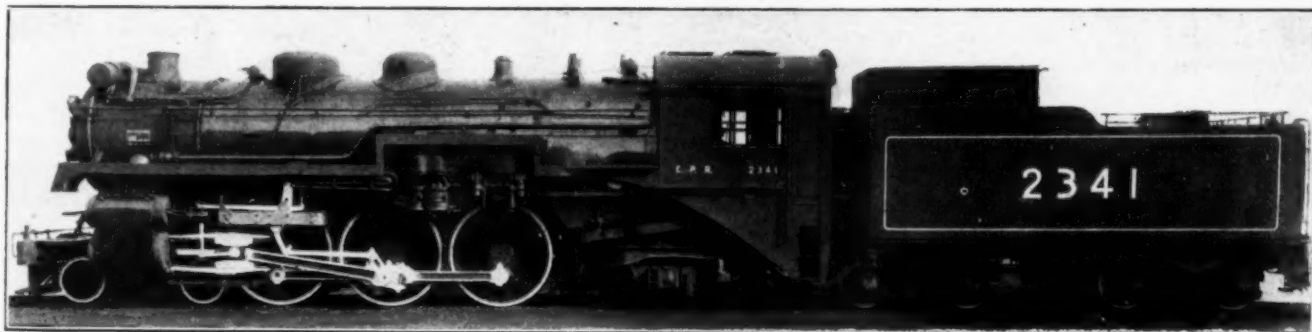
The British Empire Participates



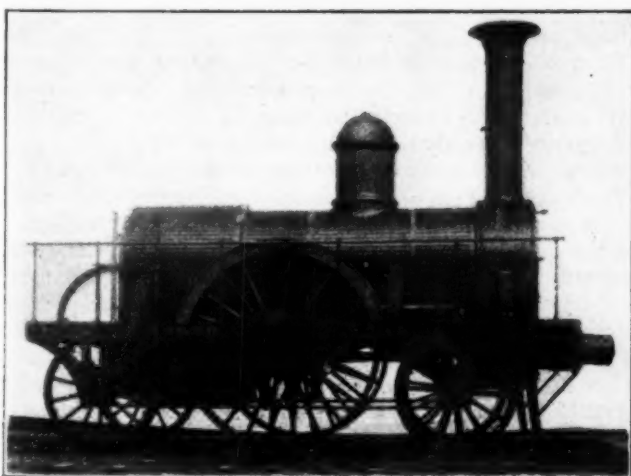
The "King George V," of the Great Western of England



The C. N. R.'s 4-8-4, "The Confederation"



A C. P. R. Pacific of the Type on Display at Halethorpe



The Great Western of England's "North Star"



A Recent C. N. R. Oil Electric Car

grounds at Halethorpe is a complete divisional organization, with a superintendent, a master mechanic, a trainmaster, road foreman, and other division officers. Daily rehearsals of the pageant have been held to make sure that everything shall go off without a hitch. The old locomotives are manned by skilled enginemen who have had several weeks' experience on the old equipment prior to the opening of the pageant.

A pavilion has been erected on the grounds to take care of providing food for the visitors. Also there are a number of refreshment booths, and one stand conducted by the Baltimore & Ohio Girls' Club at which souvenirs will be sold. Beyond these and the catalog of the exhibit, which will be retailed at 25 cents, there will be no charge for any of the show.

At one corner of the grounds a replica of an old



An Iron Box Car of the 'Forties

tavern has been built, which serves as the headquarters of the administration of the pageant and as an office for the convenience of the press. Here, as elsewhere in the exhibition buildings, the Colonial architectural motif has been carried out, even to the extent of including a summer kitchen, a carriage shed and the setting up of an old wooden pump.

Additional platform accommodations have been built at Halethorpe station adjoining the exhibition grounds to handle the passengers who come out to Baltimore by shuttle train. On the opposite side of the tracks parking space is provided for 3,000 automobiles, which may be left under the surveillance of the Baltimore & Ohio police. As an addition to these transportation facilities, frequent bus service from Baltimore will be provided.

Admission and Reservations

Free, Railroad Fares Reduced

A grandstand has been built which will accommodate 12,000 spectators. Seats in this grandstand are reservable as long as they last without charge, by application to the centenary director. For those not entitled to free railroad transportation, the railroad has established a reduced rate of a single fare plus \$1 for the round trip from any point on the Baltimore & Ohio's line to Halethorpe, which tickets must be validated on the grounds.

Several Years in Planning

Preparations for the "Fair of the Iron Horse" were begun several years ago when Edward Hungerford, director of the exposition, started devoting a portion of his time to plans. Many varied ideas developed, only to be discarded, and the plans for the exposition grew more ambitious as time went on.

At first a pageant in some Baltimore park was considered, but this was vetoed because it would have necessitated the use of tableaux and imitations, rather than real cars and locomotives. An idea from the British centenary celebration in 1925—that of running historic locomotives on the main line—was considered. How-

ever, to give everyone interested a chance to see a pageant such as this would have necessitated presentation for several days and this would have interfered with regular railroad operation. Finally, the building of special tracks for the exhibition which would not interfere with regular railroad operation was decided upon. The management worked with the thought of having as much of the show in actual motion as possible—hence the pageant. However, to complete the exhibition some stationary displays were considered necessary. The question of housing them arose. Tents and other light types of structures were thought of, but discarded as unsafe for valuable exhibits. The form of buildings chosen—brick construction with steel-supported corrugated iron roofing—was selected as offering the best shelter with highest salvage value. All steel work used is of standard lengths.

Personnel Mostly from Railroad

All the work of preparing the fair has been done by railroad company forces, with some outside specialists assisting where necessary. The buildings were designed by Mr. Hungerford, working with the engineering department, and the engineering department built them. Railroad signal forces made the signal installations and the electrical department did the wiring. The locomotives and trains in the pageant are manned by mechanical and operating department employees. All actors who participate in the pageant are railroad employees.

A dramatic director, Mrs. Adele Gutman Nathan, a chief of grandstand, G. S. Robertson, a chief of exhibits, John A. Smith, an assistant centenary director, T. C. Maxey, and Mr. Hungerford compose the outside expert assistance serving in an official capacity. The dramatic director is assisted by Miss Margaret Talbott Stevens.



A Hopper Car of the 'Forties

of the editorial staff of the Baltimore & Ohio Magazine. E. V. Baugh, superintendent of dining cars, has charge of concessions and catering.

A nucleus for the stationary exhibits was already in the hands of the Baltimore & Ohio. Stored in an old roundhouse at Martinsburg, W. Va., it had the Pangborn collection of locomotive models and many valuable pictures—a part of its famous exhibit at the World's Fair in Chicago in 1893. These models were taken out of storage and reconditioned and a selection of the pictures made for display. Then began the collection of historic equipment from the Baltimore & Ohio and other railroads.

Since last winter four shops have been busy building miniature models—bridges, cars and locomotives. The work has been most exacting, everything being done to the scale of 1/24.

In the last few months the results of the planning and earlier work have begun to take concrete form and today, the scheduled opening day, the exposition has been fully completed and is ready for the railroad's guests.



A Part of the Convention Group

Roadmasters Consider Broader Problems of Their Work

Program of convention held at Buffalo shows trend of development in track department

THE outstanding feature of the convention of the Roadmasters' and Maintenance of Way Association which was held in Buffalo, N. Y., on Tuesday, Wednesday and Thursday of this week was the manifestation of a broader outlook on the part of this organization toward the duties and responsibilities of its members. This was particularly apparent in the subjects covered in the program, for whereas they were formerly confined largely to practical discussions of the day to day problems of the track man, the meeting at Buffalo was devoted to such matters as the inter-relation of the track and stores departments, the control of material stocks, methods of reducing work train service, the safe and efficient operation of motor cars, the collection and use of cost data, the economics of heavy track construction and the education of track men in safe practices. The attendance exceeded that of previous years, more than 300 members registering.

While the subjects named above were presented in large part in the form of reports prepared by members of the association, addresses and papers by railway officers also had a prominent place in the program. Thus the subject of motor cars was presented in the form of a paper by C. R. Knowles, in charge of motor car maintenance of the Illinois Central, and the subject of heavy track construction in a paper by George J. Ray, chief engineer of the Delaware, Lackawanna & Western. In the case of material stocks, divergent views were offered by reason of the fact that this problem was discussed both in a committee report and in a paper by H. C. Pearce, director of purchases and stores of the Chesapeake & Ohio.

Mr. Ray discussed the problem of developing heavier track construction to meet the needs of increased loading, using the experience of the Lackawanna as an example. He showed how the progressive renewal of rail with heavier sections has a distinct bearing on the life of the ties, for unless future rail requirements are not anticipated, it will be difficult to avoid damage to ties that are effectively resisting decay. The difficulty is to

estimate future increases in the cost of ties and thus determine accurately how much can be spent for tie plates and fastenings as a means of protection from mechanical injury. Mr. Ray's address will be presented in greater detail in a later issue of the *Railway Age*.

The convention was opened on Tuesday morning with an address of welcome by Fred M. Renshaw, traffic commissioner, Buffalo Chamber of Commerce, and with an address by R. H. Aishton, president of the American Railway Association. Another feature of the session on that morning was a memorial for the late W. C. Kidd who had been secretary-treasurer of the Track Supply Association for the past 15 years and had exerted a strong influence in the upbuilding of the Roadmasters' Association during that period. The various sessions of the convention were conducted under the direction of President J. B. Kelly, general roadmaster of the Minneapolis, St. Paul & Sault Ste. Marie.

Following Mr. Aishton's address Mr. Kelley reviewed the work of the association during the last year and then dwelt at some length on the transition through which track work is now passing. He referred to the fact that the production of steel rails weighing 100 lb. per yard and heavier has doubled in the last ten years, approximating two million tons in 1926. Last year, he said, the railways spent \$573,000,000 for additions and betterments to roadway and \$875,000,000 for the maintenance of these facilities. He closed with a reference to the rapidly growing part that labor saving equipment is taking in track work.

On Wednesday evening the Track Supply Association gave a dinner to the roadmasters and their families, forming a party of more than 550 persons. President A. H. Told of the Track Supply Association presided and introduced as speakers E. J. Israel, Jr., industrial agent, Pennsylvania, Pittsburgh; B. Dudley, editorial writer on the New York World; George J. Ray, chief engineer of the Delaware, Lackawanna & Western; John V. Neubert, engineer maintenance of way, New York Central; J. W. Leseur, president's staff, New York Cen-

tral Lines, and Elmer T. Howson, western editor, *Railway Age*.

Following are abstracts of various papers and committee reports presented at the convention.

R. H. Aishton Addresses Convention

Mr. Aishton, spoke in part as follows:

Those of you who can look back along the years as far as I can, cannot but observe startling changes in your field of endeavor. A rapid change has come in this field during the past few years. Picking up a maintenance of way magazine the other day I was surprised at the volume of advertisements of expensive and complicated maintenance machines designed for use in performing the work formerly accomplished by human toil and endeavor. The list of such devices is too long for mention in a brief talk of this kind. Hardheaded business men were advertising electric or pneumatic tie tampers, rail laying machines, mechanical track liners, trenching machinery, paint sprayers, and numerous electric-driven tools for performing track work formerly accomplished by sweat and brawn. The end is not yet for still other devices are appearing daily and are being adopted as their practicability is being demonstrated.

Somewhere I have seen an estimate that the investment of the railways of the United States and Canada in equipment to increase efficiency and economy and incidentally to take the drudgery out of maintenance of way work exceeds over four hundred millions of dollars. All of this means but one thing to the far-seeing roadmaster; that is that he must abandon the old rule-of-thumb methods which served for so many years. In order to separate the true from the false, the good device from the bad, and in order to enable his forces to obtain the utmost efficiency from these labor-saving devices he must study many branches of applied science.

This Is the Association's Field

It is in this field that your association can and has been doing excellent work. It has truly been said that no man's judgment is better than the facts upon which such judgment is based and no greater value can accrue from your membership in this association than comes through the gathering of facts and opinions; the reports of experiments and experiences at these meetings.

The field of physical endeavor and accomplishment, however, is only one of many in which the roadmaster can well serve his employer. The railroad needs more than rolling stock and road bed to make it a success. It needs the support and co-operation of the public, of every shipper and receiver along its line and it is in this field of so-called public relations that you can exert a strong and worthwhile influence. Probably no men in the railway organization have closer touch with the patrons of the road, particularly in the smaller communities or on the farms that line our right of ways, than the roadmaster and his assistants, and no men, therefore, have a greater opportunity of molding public opinion favorably toward the railroad which they serve.

Through the great agricultural regions of this country the roadmaster and his assistants are the representatives of the transportation industry, outside of the station agent, who come in most direct personal contact with the owners of farms through which the railroads pass. Go out of your way to get acquainted with these people and prove that you are a good neighbor. Acquaint them with what you are doing and why you are doing it. Find out if it is to their satisfaction and in general show that you are their friends. They will respond readily, and tell all their neighbors about it, and out of it all will come an increased fellow-feeling.

The Cards Are on the Table

The better public relations existing today between the railroads and the public of this country comes from the fact that the railroads have given adequate and efficient service. They have laid all their cards on the table. They have told the public exactly what their difficulties were and told them honestly. The public has believed them and is willing to help them. My advice to you is to carry out this same principle in your daily and yearly contact with your neighbors.

In making an appeal to shippers and receivers for the heavier loading of freight in cars we have been rather surprised at the number of instances in which shippers have replied to the effect that the railroads should first clear their own skirts and arrange for heavier loading of company materials and supplies. Evidently, whether it is well-founded or not, there is a deep-seated feeling on the part of shippers and receivers that railroad materials and supplies are being "light-loaded."

I hope that every one of you will make it your duty to see that each car carries as near its full tonnage as is practicable. You can also help in spreading the gospel of heavier loading among those located along your line and I can assure you that there is no one thing that is more important to the railroads today than obtaining the heaviest possible loading per car, coupled with prompt loading and unloading.

Committee Urges More Uniform Forces

Illustrations of what some railroads in the north have been able to accomplish in the way of winter work by their track forces were offered by one committee as a means of promoting a rearrangement of track work to promote a greater uniformity of employment throughout the year. The report of the committee was in part as follows:

Despite the opinion of some that track laborers need no special training, track work is a specialty; and trained men are required for efficient and economical up-keep of the sections. Taking the whole country into consideration, it must be admitted that there are today fewer expert trackmen in proportion to the railway mileage than there were, say, 20 years ago. The reason for this is the unsteady work that is given trackmen.

By programming maintenance work throughout the year, the labor turnover can be greatly reduced. On the Delaware & Hudson in 1920, when maintenance work was done on a strictly seasonal basis, the man hours, employed by maintenance force aggregated 4,150,000, whereas, in 1926, when the maintenance program was carried on throughout the year, the man hours employed declined to 3,281,000, a saving of 869,000 hours. During the early spring or summer months, if the maintenance program is heavy, track forces on this road are employed 10 hours a day for not to exceed three months of the year, thus eliminating the necessity of employing additional forces and inexperienced labor. Likewise, if it becomes necessary to reduce forces, due to a depression in business, the youngest in service are furloughed until such time as the department is permitted to return to its permanent force basis, when the men furloughed are called back and reinstated at the same rate of pay they were receiving at the time they were furloughed.

What work can be done in the winter months? The items of importance for winter programming are the laying of new and relay rail, the installation of tie plates and anti-creeper, the renewing of switches and frogs, the gaging of track, the tightening of bolts, tapping down spikes, distributing ties, repairing right-of-way fence, cleaning right-of-way, cutting brush and widening fills with cinders.

The rail laying operations are accomplished in the winter by bunching section and extra gangs. On days when it is not possible to lay rails due to adverse weather conditions, the men will be busy cleaning snow and ice to keep trains moving. The overtime lost by bunching section and extra gang men for this class of work will average 1½ hours per man riding time each day. The lost time is overcome, however, by the fact that one is working experienced men who do better work and practically the same amount as would be done by working inexperienced men during the summer months.

Advantages of Uniform Forces

The advantages of employing uniform forces may be summed up as follows:

- (1) Year-round employment results in holding more efficient and better men.
- (2) The men are more efficient in the winter as compared with the summer as they can do more work in cool weather than in hot weather.
- (3) When practically the same number of men are required to do ballasting as to make rail renewals, the organizing of new forces is eliminated.
- (4) Labor-saving devices used in the summer months can be made year-round tools and lower the cost of laying rail during the winter months.
- (5) The expense of providing and maintaining camp cars is materially reduced.
- (6) The cost of spurring out camp cars on dead tracks is also reduced.
- (7) The congestion from concentrating all heavy maintenance work during the summer months when traffic is generally the heaviest is avoided with its resulting increased cost of work on account of heavy traffic.
- (8) The number of accidents on account of working experienced men is reduced.

Committee: E. E. Crowley, roadmaster, D. & H., chairman:

C. W. Coil, roadmaster, N. P., vice-chairman; O. V. Parsons, assistant engineer, N. & W.; M. J. Cooney, track supervisor, Erie; F. R. Rex, supervisor, Penna.; R. J. Yost, roadmaster, A. T. & S. F.; P. J. Hurlhe, track supervisor, N. Y., N. H. & H.

Discussion

Comments and questions offered following the reading of this report indicated a general indorsement of the movement for more uniform employment of track forces, although there were some differences as to details. There was also a feeling that the report might have given more attention to the opportunities for employing section men profitably in winter on routine maintenance operations, whereas the report was concerned primarily with major operations.

Discuss Track Material Stocks

The control of track material stocks was approached from two angles during the convention. It was the subject of a paper by H. C. Pearce, director of purchases and stores of the Chesapeake & Ohio, as well as the report of a committee on The Track Department's Share in the Control of Stocks. Mr. Pearce's paper consisted in the main of an outline of the practices pursued on the Chesapeake & Ohio. His general statements were as follows:

Abstract of Mr. Pearce's Paper

I will assume that we all agree that there shall be a separation of the service of supply from the using departments and that the duties of each are clearly and definitely defined. The only supply department which I will sponsor is one which is so organized and directed as to deliver to the users the material they require to carry on their work when they are prepared to use it. Any other organization is not a service of supply—it is merely a bureau for the transmittal of documents. The using departments have a right to predicate their operations and arrange their work on the basis of an assured supply of materials being provided on specified dates. The division of purchases and stores must assume full responsibility for the scheduling, purchasing and distribution, to the end that the materials will be delivered at the time and place agreed. The responsibility of the using departments consists in knowing accurately the moneys available for the work, definitely programming by accurate study and check (not by guess) that which will be needed and the time required to procure (the time must be sufficient to enable the division of purchases and stores to arrange for its purchase, manufacture and transportation to the points of use).

Much has been said and written regarding the control of line stocks, meaning material which is carried on the line for work to be done at some future time. I am unalterably opposed to the principle of line stocks. They have no place in the present economical maintenance of our properties. Materials necessary to maintain in stock to protect the property and take care of the ordinary requirements, should be stored in as few places as possible—preferably one, and so arranged that they are available on a few days' notice, and with the required transportation. Necessarily there must be a liaison officer of ability and proper rank to co-ordinate the requirements of maintenance officers. All requisitions for maintenance of way materials should be sent to this officer (or officers) and they in turn must be required to keep in daily touch with the progress of the work, to the end that the material will, so far as practicable, flow from the supply depot to the work in quantities sufficient to meet the demands and prevent unnecessary accumulation. The result of this plan will effect large savings in work train service, cost of handling, etc., to say nothing of the losses due to a different practice because of greater investment and accumulation of unnecessary stocks. The detailed methods of carrying out this general plan must necessarily vary on different railroads and under different conditions, but on no railroad, and under no conditions, is there any sound reason why the general principle of consolidating materials at one or more places and only moving it to the work as required can not be carried out.

I have heard supply officers remark that track, or roadway material (as it is commonly called) gives them more trouble than anything else. I do not agree with this statement. I have found the providing and control of roadway material comparatively easy, and the officers in the maintenance of way de-

partment strong, clean cut, practical men. All they have ever wanted was assurance that the material which they needed to use would be forthcoming when required, but it is equally true that they have not always considered their own responsibility in programming, scheduling and determining their needs. To this work the track department can do its full share in bringing about the greatest economy in the reduction of stocks of materials.

Discussion

Supplementing Mr. Pearce's remarks, C. J. Geyer, engineer-maintenance of way of the Chesapeake & Ohio, described the manner of handling released material on his road. Rail, he said, is classified on the ground by expert inspectors and distributed accordingly. All other material is shipped to the central reclamation plant for classification. Material that is usable, or made so by reclamation, is turned over to the stores department for re-issue.

Abstract of the Committee Report

Material for track department uses may be classified under three headings. One includes material for emergencies to protect traffic in the case of wrecks, derailments or sudden breakdowns; another comprises material for authorized jobs and for the seasons' main and side track rail programs. The material for these two requirements is all that need be on hand on a track sub-division which has an efficient supply train service. Where there is not good supply train service, however, there must also be a third or division headquarters stock. Material on a section or sub-division, not included in these groups is surplus and should be moved to another point where needed or returned to the general store.

The practice of keeping large stocks of materials at each supervisor's or roadmaster's headquarters should be avoided. Only such stocks should be kept at these points as will be needed to meet emergencies. The quantity will vary materially with the importance of the district, and the density of the traffic. The matter should not be left, however, entirely to the judgment of the supervisor, as most of them have a tendency to over-stock. Also, as a usual thing, they do not have the facilities for taking care of material properly at these outlying points, such as are provided in a regular stock or supply yard.

In all cases the old stocks of materials should be used first in preference to new material. This applies especially to any materials stored outside and not under cover. Timber of all kinds deteriorates rapidly and becomes badly season-checked after lying outside. Rails and in fact all metal also deteriorates quickly and old stocks should be used in preference to new material. Rails and emergency material, such as frogs, switches, joints and angle bars, stored for emergency use should be painted to protect them from rust.

Definite arrangements should be made with the purchasing department to have all orders filled promptly. In order to keep the stock at a minimum at all times, there should be a thorough understanding between the roadway and purchasing departments, as the lack of this very often causes serious delays and duplication of orders.

A close watch should be kept on the supplies around tool houses and camp cars. A large item of waste is caused by letting foremen accumulate unnecessary quantities of tools and appliances at their tool houses. This material is never well kept, and in many cases becomes unfit for service by being exposed to the weather, and the lack of proper facilities to keep it oiled. Some foremen go to the extent of hiding material and tools, in order to keep an excess supply on hand, and in many cases foremen forget where they hide this material and when found, if ever, it is in many cases worthless except for scrap.

A continuous campaign of education should be carried on among employees to keep before them the actual cost of material in dollars and cents and the importance of conserving it.

The reduction of stock can be aided to a great extent by a well equipped reclamation plant, and a well defined policy of reclaiming all serviceable material immediately and returning it promptly to service.

A complete record of the stock on hand of all roadway materials in the supply yards should be compiled each month and placed before the proper officer, and any excess material that has accumulated at any one point, from any cause, such as the abandonment of a project, the changing of plans, or cancelled authority, can be transferred immediately to other points, to replenish stocks that may be low. The purchasing agent should be supplied with a copy of this information also, and his attention called to the supplies that may be on hand at points where they are not needed. This information is valuable for him, and

will in many cases, make it possible for him to avoid ordering duplicate supplies from manufacturers, thereby increasing the stock unnecessarily on the system as a whole.

Handling of roadway supplies should be kept as nearly as possible in the hands of the roadway department, rather than the purchasing department. The purchasing department, at times, does not realize the necessity or the importance of handling certain supplies promptly. Likewise all reclamation plants, in my opinion, should be under the direction of some representative of the track department for its officers usually have a better practical knowledge of reclaiming material, and better judgment as to what material should be reclaimed, and what should be scrapped. The importance of reclaiming the serviceable material is now well understood and the process by which this is accomplished is so well known that it does not require much discussion.

Committee: W. A. Davidson, roadmaster, U. P., chairman; M. Donahoe, general supervisor of maintenance, C. & A., vice chairman; B. E. Haley, general roadmaster, A. C. L.; K. M. Hamman, track supervisor, Long Island; W. Wharry, general roadmaster, C. N.; C. Feucht, roadmaster, U. P.; E. P. Safford, supervisor of track, N. Y. C.; B. Esbenson, general roadmaster, L. A. & S. L.; E. Bennetson, roadmaster, U. P.

Discussion

Discussion of this report brought out the growing tendency toward the provision of a smaller amount of rail for emergency use. Instead of providing a rail at each mile post some roads consider one rail to a section entirely adequate. One speaker contended that as little new rail as possible be provided for this purpose because the occasions for its use were usually rare for the first four or five years in the life of new rail and that by the time the number of breakages was heavy, the new rail provided for replacements would make a poor fit.

Means of Reducing Work Train Service

Work train service has always been a major item in the cost of performing certain operations in track maintenance, the principal work involving work trains being rail replacements, tie renewals and ballasting. With the general trend toward higher compensation for train and engine crews which has prevailed for some years, and the punitive overtime rates now in effect, it is essentially a part of good management to study ways and means of reducing this expense.

We must not lose sight of the fact that with the increased weight of rail, and with more and heavier track material in general, together with a constantly reiterated demand for the utmost efficiency in maintenance work, the following basic principles exist:

- (A) Work trains are a necessity.
- (B) Work trains being necessary, their efficient operation is essential.
- (C) To secure efficiency the planning of work is of primary importance.

The planning of work for these trains should include the determination of the following points:

- (A) Can we secure substitutes for work trains in certain operations?
- (B) What machinery can be used most economically?
- (C) How many men should be assigned to a work train?

[Many suggestions were offered by the committee for the avoidance of work train service, drawing on the actual experience of various roads. Following are a few illustrations together with the committee's conclusions:]

On two divisions two motor buses have recently been put in service to transport extra gangs to and from work, on the highway, the buses handling both men and tools.

A universal crane is also being used, mounted on a five-ton truck, handling supplies in a material yard, operating a clam shell to load and unload material and to handle stock pile and steam shovel pit tracks in sections or panels.

Of 20 roads reporting, 15 state that motor cars and trailers are used to handle ties and track fastenings from stations to points of work out on the line. Two roads report that no economy has been effected while several others report from 25 to 40 per cent savings as compared with work train service.

Heavy duty motor cars and trailers are in general use for hauling extra gangs.

Several roads report the use of motor trucks to handle material from storehouses to jobs in terminals.

Work train service may be reduced in ballasting operations

through the use of modern ballast cars which may be dumped from either center or side or both.

The reports received indicate that modern ballast cars are a potent means of reducing work train service in all ballasting operations.

Conclusions

1. The roadmaster or supervisor who is responsible for work should have full charge of all track maintenance work trains.

2. A first-class foreman and a suitable force of men should be assigned to work trains, the crew to be regularly employed on such work when conditions permit. When a work train is required for any considerable length of time, a foreman should be assigned and rates of pay for foremen and laborers should be higher than those paid for other regular work, as this will make the work attractive and will result in economy.

3. The daily assignment of crews on work trains should be in conformity with the present practice of most roads and crews should only work such hours as will enable track gangs and the work train gang itself to be used economically.

4. Work trains should not be used in terminal yards, as such work can be handled more economically by self-propelled steam or gasoline cranes.

5. Each operation involving the possible use of work trains should be given careful consideration, as it may be found that some plan will be found practicable whereby the use of a work train may be partially or entirely avoided.

6. As the co-operation of the maintenance and operating departments is essential to economy in maintenance work, it is of the utmost importance that detailed study be made of work where trains may be required, and expedients, such as setting back dead freight trains, diverting trains to another track, etc., adopted to avoid the delays usually incidental to work train operation. The furnishing of proper equipment must of necessity include a suitable locomotive of proper capacity and in first-class condition so that no delays will result from lack of power.

7. Where consistent with current agreements covering the assignment of train and engine crews to work trains, we believe that men who are known to be best fitted for such work should be assigned.

8. The work should be programmed and studied so that no unnecessary work train service will be used. When work trains are in service see that they are utilized to obtain maximum results, and that as many jobs as possible will be done on one trip, avoiding repeated trips over the same job. Impress every employee having to do with work trains with the necessity for curtailment of costs, which must be brought about through increased efficiency. This means STUDY, ORGANIZATION, SUPERVISION.

Committee: P. J. McAndrews, roadmaster, C. & N. W., chairman; W. A. Clark, supervisor, Reading, vice-chairman; A. Chinn, assistant engineer maintenance of way, C. B. & Q.; J. M. O'Connell, track supervisor, N. Y. N. H. & H.; G. G. Smart, general roadmaster, G. N.; J. J. Desmond, roadmaster, I. C.; J. G. Hartley, division engineer, Penna.; J. H. Dooling, assistant supervisor, B. & M.; B. E. Haley, general roadmaster, A. C. L.

The Use and Abuse of Motor Cars

By C. R. Knowles

Superintendent Water Service, Illinois Central

It is estimated that there are 55,000 motor cars in service today on American railroads, representing an investment of between \$11,000,000 and \$12,000,000. Nearly 40,000 of these cars are used in maintenance of way work. It is impossible to make an intelligent prediction as to the possibilities and the future direction of development but there is no doubt that as the motor car is further developed it will have an ever-widening scope of use, particularly in maintenance of way work, and as more powerful cars are produced it is safe to predict that the motor car will take the place of the work train to a large extent.

While it is not to be expected that the motor car will ever entirely displace the work train it has already become an important factor in reducing the amount of work train service required in many instances. This is particularly true in transporting men to and from the job, and also in many cases in handling material, as for example in distributing ties. The average annual work train mileage on Class I railroads for the five years from 1911-15 inclusive was 46,911,000 miles, as compared to 33,560,000 miles for the five-year period ending with 1926, an average annual reduction of 13,351,000 work train miles that can undoubtedly be credited very largely to motor cars.

With the increase in cost of work train service it has been difficult in many instances to justify the expense for a work train for handling men alone. The motor car has solved the problem of getting men to the job quickly, and in addition to reducing the expense for such service has eliminated much of the delay incident to clearing regular trains, as the motor car can

be set off at almost any point on the right-of-way, and can frequently get to the job ahead of a regular train, where it would not be expedient to move a work train until after the regular trains had passed.

While it is readily admitted that a marked saving is effected by the use of motor cars, it has been difficult to produce actual figures or even approximations of the actual savings except for individual roads. Reports prepared by Western railway presidents for presentation before the Interstate Commerce Commission some years ago showed marked savings in the use of motor cars; one road reported that with the use of 666 cars the annual saving amounted to \$150,000; another road having 1,266 cars estimated an annual saving of \$379,809; still another road having 689 cars in service estimated a monthly saving of \$21,796.

The service secured from a motor car will depend very largely upon the manner in which it is operated. The modern railway motor car is not a complicated machine and its successful operation does not call for any particular mechanical skill. Assuming that the operator has average intelligence and ability he should be able to operate the car for years without other than minor repairs. The life of motor cars commonly ranges from 1 to 10 years and the useful service about 20 days out of 30. When we consider that the average section car is in actual use for only one or two hours per day there does not appear to be any good reason why it should not give unflinching service as required for at least 10 years. That the cars show an average life much lower than could reasonably be expected with an average annual maintenance of 25 to 30 per cent of the value, can be attributed only to poor operation and to abuse.

[Mr. Knowles then presented a fund of valuable information and suggestions for the improvement of motor car operation, designed to increase the life and reduce the cost of maintenance.]

The Accident Record

According to Accident Bulletin No. 94, of the Interstate Commerce Commission, hand cars or motor cars struck by locomotives or cars caused 47 deaths and 161 injuries in 1925, of which 36 deaths and 125 injuries were sustained by employees on duty, aside from train service, while 8 employees were killed and 1,067 were injured in non-train accidents in which hand cars were involved, and 53 were killed and 3,226 were injured by similar accidents in which motor cars figured.

If an analysis were made of the causes of these accidents, in all probability we would find that the primary causes were: 1—Ignorance; 2—Recklessness; 3—Stubbornness. The first mentioned cause of accidents can be overcome through proper education and training, as it is not sufficient that the workman be trained to accident prevention but it is also necessary that he be trained to safety habits on the job.

The objection frequently advanced in opposition to the use of the motor car is the hazard of its operation. This objection has undoubtedly been the principal factor in retarding its general use on many railroads. As a matter of fact the motor car should be no more hazardous in operation than the hand car, yet the record of accidents in motor car operation—which show that one death out of every eight in non-train accidents is caused by a motor car—would appear to bear out the assumption that its operation is more dangerous. Therefore, it is evident that the element of danger is dependent very largely upon the manner in which they are operated.

The efforts of the manufacturers have been directed toward making the cars safe in operation while the railroads have worked toward the same end by promulgating rules for the safe operation of the cars. A code prepared by a committee of the American Railway Engineering Association includes 25 rules—which are supplemented by additional rules on individual railroads—governing the use and operation of motor cars. It is safe to say that nearly every accident is due to the violation of one or more of these rules, while their strict observance will very materially reduce the number of accidents.

Unfortunately, however, the existing rules are being constantly violated and it is a regrettable fact that the supervisory officers are among the principal offenders in this respect, not only in their failure to enforce strict observance of the rules by their subordinates, but in the fact that they themselves fail to observe the precautions and instructions that they have provided for their men.

The duty of supervisory officers in the enforcement of rules governing the operation and use of motor cars is twofold; first, by setting an example by the strict observance of the rules themselves; second, by giving the question of motor car operation closer supervision, stopping unsafe habits, enforcing the rules of safety and applying disciplinary measures where warranted. When the supervisory officers themselves have become sufficiently impressed with the necessity for the observance of the existing rules that past experience has demonstrated to be

necessary to the safe operation of motor cars, a long step will be taken toward the reduction of accidents, not only among the men of this rank, but among the subordinates, and a similar observance of rules among foremen and operators of cars can be consistently enforced.

Discussion

Comments on Mr. Knowles' paper indicated that his pointed appeal to the supervisory officers was taken in good spirit. The discussion of details centered largely on the problem of keeping motor car operators advised of train movements, and while it was the consensus that possession of a "lineup" does not relieve the operator of responsibility to protect his car, it was felt that those in charge of track motor cars should receive better co-operation from the dispatcher. Two speakers reported favorably on the practice of having the dispatcher issue a bulletin to all operators each morning just before the leaving time of section gangs, giving a complete schedule of train locations.

The Collection and Use of Cost Data

The Committee on the Collection and Use of Cost Data presented a report supplementing the information offered at the preceding convention. In addition to a statement of general principles (abstracted below), it offered two appendices illustrating the methods of gathering and using cost data employed on a road that has gone further than most systems in this direction. The committee also urged members to assist the committee in collecting and compiling data. A brief abstract of the report follows:

The object in the collection of cost data is to provide the basis for analyzing work, to the end that greater efficiency and economy may be attained. It is also evident that in outlining a systematic method of collecting cost data, there are three principal requirements to be satisfied:

1. The data, to be accurate, must be based on a simple system of reporting, by means of which the foreman can state briefly the work that he performs, and this without involving any additional clerical labor on his part.

2. The report must be in such shape as to permit supervisory officers to value the work at a glance in order that they may take prompt action to correct faults without waiting for the compilation of formal reports.

3. The roadmaster is not in a position to devote time to assembling this data which would be of great value to him. He should, therefore, be given the assistance necessary to obtain the information. As this requires an additional expenditure, it must be demonstrated to the management that the expense is more than justified by the saving to be made.

Accounting cost systems, such as the Interstate Commerce Commission classification, while sufficiently specific for the purpose of governing economics or financing in a large way, are of little benefit to the local officer, for they are too indefinite for ready use. When it is considered, for instance, that Account 220 of the I. C. C. classification includes the aggregate cost of the application of ties, rail, ballast, other track material, line and surface work, etc., it is apparent that any specific knowledge of costs must be obtained by the railroads from studies of their own.

The extent to which the subdivision of items is justified is determined by the relative importance of the individual classes of work; this selection of items, together with the method of making the studies and applying the knowledge gained, is the problem in establishing a practical working cost system.

It is evident that even the simplest system, if it is to cover the whole subject of track work, will produce a numerous variety of figures, the assembling of which requires time. On extensive territory the results would be so delayed that corrective measures would be out of question.

It is also apparent that, in comparing costs on different railroads, or even on the same road, differences exist in conditions due to the character and quantity of work involved in any particular units application, as well as such other modifying factors as climatic changes, traffic densities and varying hourly rates. It follows then that to get a true comparison of results, it is necessary to establish standards of performance that makes due allowance for modifying factors; that is to say, that reduce performances to a common basis.

To simplify the situation a method of showing all perform-

ances on a percentage basis can be used. It is possible from the thousands of time studies that have been made on various roads to set up standard schedules for most classes of work. The standards now in effect on one road, where such a system is in use, were established by taking two-thirds of a possible day's work as 100 per cent performance. Incidentally, it is not necessary that any schedule be more than reasonably correct, but it is absolutely necessary that a schedule, once adopted, remain without change, otherwise periodic comparisons are incorrect.

Committee: C. H. R. Howe, cost engineer, C. & O., Richmond, Va., chairman; G. T. Anderson, roadmaster, K. C. S., Heavener, Okla., vice-chairman; F. W. Easton, roadmaster, S. P., Ogden, Utah; R. H. Orwig, supervisor, Pennsylvania, Parkton, Md.; F. J. Meyer, assistant engineer, N. Y., O. & W., Middletown, N. Y.; D. V. O'Connell, roadmaster, C. & N. W., Mayfair, Ill.; W. H. Sparks, general inspector of track, C. & O., Russell, Ky.

Discussion

The principal question raised in the discussion of this report concerned the reason why it was necessary to have a separate cost organization rather than to have the cost data compiled by the accounting department. The answer given is that cost data to be of value must be prepared by men who know the conditions on the ground and have a thorough appreciation of the significance of the various items recorded. Furthermore the data, to be of value to the supervisory officer, must be available at once, while a cost assistant in the office of the supervisor has proved to be an exceedingly valuable member of the staff. The report was endorsed by William Shea, general roadmaster of the Chicago, Milwaukee & St. Paul, who described the cost system maintained on that road for the work of five system rail gangs, which has made it possible to ascertain the actual expense incurred in conducting the various detailed items of the work and thus learn the best method of performing each.

Education and Accident Prevention

One of the most valuable reports presented at the convention was that of the Committee on the Practical Education of Trackmen as a Means of Preventing Accidents. It consisted in large part of a series of practical suggestions for safe practices covering all of the usual operations involved in track work. The general remarks of the committee were in part as follows:

The committee deplors the feeling that seems to prevail in some quarters that safety work should be left to special safety men. Even if that idea were sound theoretically, which it is not, it would be impracticable in the maintenance of way department, because the forces are so widely scattered. The large labor turnover, with new and temporary men frequently entering service, makes such a method impossible.

Safety teaching and training must be done by the officers and foremen in the maintenance of way department. They are the only ones constantly in position to see the need for correction and to apply it. As a foundation for both teaching and training, this committee believes that a special book of rules and instructions for trackmen and bridge and building men should be in effect upon every railroad employing a considerable force. Such a book should be comprehensive, prescribing in detail the action to be taken under all circumstances that can be foreseen, including methods of doing every kind of track, bridge and building work, and instructions for the care, handling and use of tools, equipment and material with which they are required to be familiar. We recommend that the formulation of a standard code of maintenance of way rules be undertaken.

Each maintenance of way foreman, assistant foreman, or track car operator should be given a thorough examination on all the rules at intervals of not more than five years. He should be given a review on all rules pertaining to the protection of trains and the handling of track cars each year by a division officer of the maintenance of way department. Every new candidate for such a position should be required to pass an even more thorough examination.

Nothing is more conducive to accidents than to tolerate the violation of a rule part of the time or under some conditions not specified in the rule itself, and then expect it to be observed at other times or under other conditions. If the rule is not right or sufficiently definite, it should be revised. If it stands, it should be enforced.

To enforce rules discipline must be applied. The committee recommends actual suspension from service as being more effective than demerit marks or book suspension. Record of reprimands or suspension should be made on the personal record cards of all examined employees, and previous records should be consulted before discipline is assessed. Repeated offenses merit the severest handling.

Severity of discipline should be determined by the gravity of the hazard incurred, rather than by the actual result. Suspending a man from service for violating a safety rule when no accident resulted, has a much more exemplary effect upon the personnel of the department, than discharging him permanently after an accident has occurred.

This committee believes that there is a great field for accident prevention work in teaching safety rules to track laborers and training them to observe such rules—also in the study of all of the operations performed by men in their work and determining what is the safest practice both for him and those near him and standardizing that practice. These safety rules and standard practices should be put in clear, plain wording in the several languages used and placed in the hands of every man in the service. Laborers should be required to read them or have them read.

We recommend that safety meetings attended by approximately half the foremen on a roadmaster's or supervisor's territory to be held each 60 days, alternate foremen attending alternate meetings, so that each gets to at least three meetings a year. Interpretation of instructions, standardization of practice and improvement of tools and equipment should be covered at such meetings. Foremen should teach safety rules and question laborers on them at lunch time, rainy hours, and every other opportunity.

If the laborers know as well as the foremen what the rules require for safety, this has a deterrent effect upon the foreman who might feel inclined to "take a chance." It also helps the officers to find out just who is responsible when investigating an accident or injury.

Accidents Should Be Investigated

Personal injuries to employees should be investigated thoroughly to ascertain the exact cause. This requires serious thought on the part of the investigator. Often the employee is blamed for individual carelessness or negligence, when the method of doing the work should be changed. When the cause is determined, the way to avoid a repetition of such an accident must be decided upon, and the circumstances of the case and the remedy should be circularized among all interested employees.

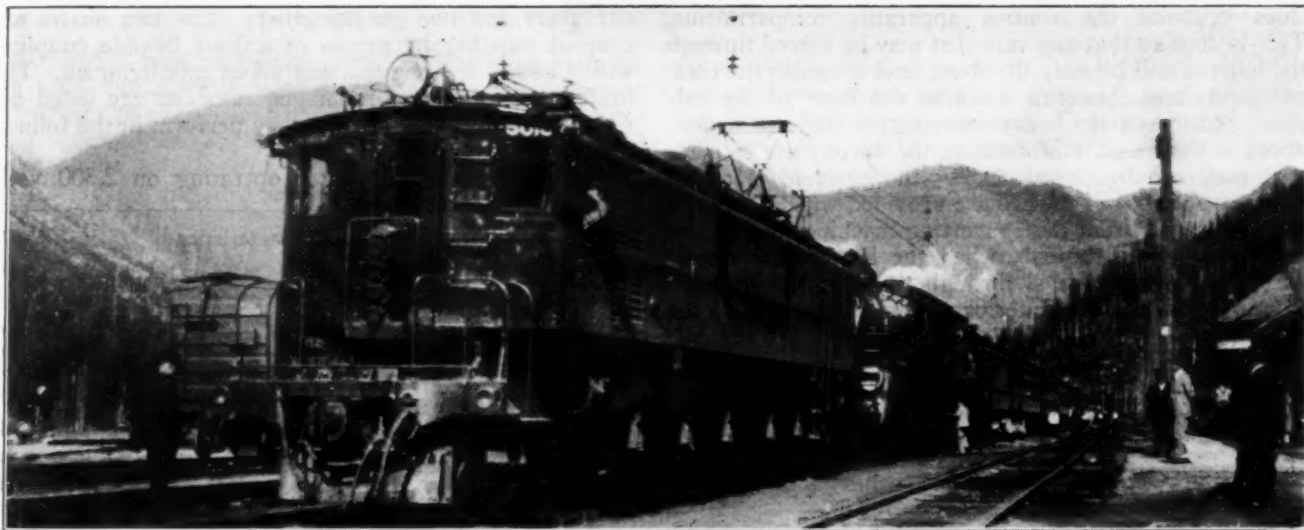
One of the most frequent causes of casualties to trackmen, though not often realized by operating officers, is lack of sufficient supervision. Frequently there are as many men in a track gang as in a company of soldiers, but rarely is it as well officered. Perhaps there are only a foreman and a timekeeper, with possibly an assistant foreman on a gang of 40 to 80 men—just a captain and first lieutenant.

We believe that there should be more second lieutenants, sergeants and corporals in these track companies for the prevention of accidents, as well as for efficiency of the service. We recommend the use of more assistant foremen, gang leaders and squad leaders, with suitable differentials in pay rates. This will carry responsible supervision further down to prevent accidents, and will develop more men for use as foremen, as well as decreasing labor costs by securing greater output.

Committee: G. H. Warfel, assistant to general manager, U. P., Omaha, Neb., chairman; J. H. Dooling, assistant track supervisor, B. & M., Waltham, Mass., vice-chairman; E. C. Buhrer, supervisor, N. Y. C., Kenton, Ohio; William Lawrenz, supervisor, C. & E. I., Dolton, Ill.; F. H. Masters, assistant chief engineer, E. J. & E., Joliet, Ill.; J. M. Tuten, general roadmaster, A. C. L., Savannah, Ga.; and C. E. Doty, supervisor of track, N. Y. C., New York.

Discussion

The character of motor car set-offs was the subject of a lengthy discussion, several speakers objecting to filling between the rails because of the obstruction this introduces for flangers, but others contended that this was of far less importance than the value of such construction in reducing the hazard of injury to men lifting cars off the track in a hurry. Much of the discussion of this report related to the interpretation of the rules for safe practice submitted by the committee and while some of these were deemed unnecessarily restrictive, they were accepted without amendment. H. R. Clarke (Chicago, Burlington & Quincy) pointed out that nearly all of the rules offered as a means of avoiding accident were also in the interest of increased efficiency of work.



Electric Locomotive Hauling Great Northern Train

Great Northern Electric Locomotives

Motor-generator type provide variable speed, regenerative braking and smooth acceleration for heavy grade line

By Robert Walsh

Railway Equipment Engineering Department, General Electric Company

TWO articulated, motor-generator type electric locomotives have been completed by the General Electric Company for the Great Northern. One is now in service and the other being shipped. Two other similar locomotives are undergoing construction. Until the electrified section is completed, the locomotives will be used in both freight and passenger service between Skykomish, Wash., and the present Cascade tunnel which is a distance of 24.6 miles. They will then be operated between Skykomish and Wenatchee, Wash. When electrified, this route will be about 72 miles in length and will include the new $7\frac{3}{4}$ -mile tunnel and a new cutoff which will decrease the maximum grade there from 2.2 per cent to 1.6 per cent.

The locomotive is of the geared motor type and has the converting apparatus and cab mounted on a cab-underframe, which in turn is supported through two center plates on two trucks. The trucks are articulated and each truck has three driving axles with an extension of the truck resting on a single-axle radius-bar guiding truck.

Single-phase power is obtained from the trolley at 11,000 volts, 25 cycles, and is transformed to 2,300 volts. A synchronous motor operated at 2,300 volts drives, through a flexible coupling, two direct-current generators which are connected in series and supply current at 1,500 volts potential to the traction motors. The speed of the locomotive is chiefly controlled by varying the voltage of the generators, additional speed being obtained by two field-shunting positions.

Mechanical Construction

The box-type cab is 63 ft. in length and has sides and ends of $\frac{3}{32}$ -in. steel plate riveted to a structural framework stiffened by bolster bars and a $\frac{1}{4}$ -in. steel plate

floor. The bolster bars are bolted and riveted to the cab-underframe at two places 31 ft. 1 in. apart. The cab-underframe is made up of four 18-in., 45.8 lb., ship-building channels riveted together with bars so as to form two I-beams which extend the entire length of the

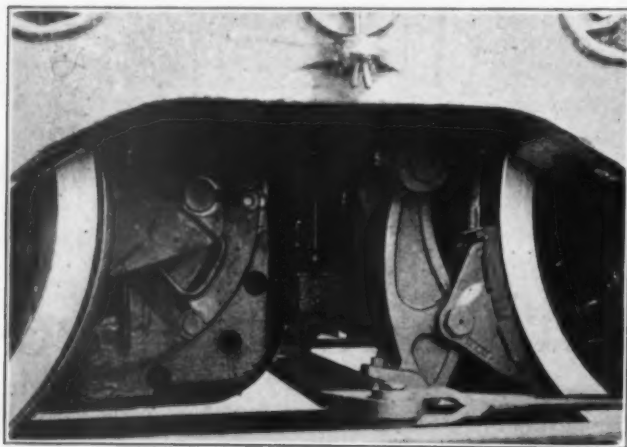
General Dimensions

Classification	1-C+C-1
Gauge	4 ft. 8½ in.
Total weight	518,000 lb.
Total weight on drivers	409,800 lb.
Weight per driving axle	68,300 lb.
Dead weight per driving axle	16,100 lb.
Weight per guiding axle	54,100 lb.
Total wheel base	58 ft. 8 in.
Maximum rigid wheel base	15 ft. 4 in.
Diameter of driving wheels	55 in.
Diameter of guiding wheels	36 in.
Length overall (inside knuckles)	73 ft. 9 in.
Width overall	11 ft. ¾ in.
Height over pantograph (locked down)	15 ft. 3 in.
Number of motors	6
Type of motors	GE-290-A
Minimum radius of curvature	250 ft.

cab. In addition to the bolster bars and cross-plates which stiffen and join the two I-beams, steel plate is riveted along the top and bottom, making an air duct through which air is supplied to all the motors.

There is an engineman's compartment at each end of the cab; and between each are located the direct-current control apparatus compartment, starting motor and regenerative braking exciter, main direct-current generators, traction-motor blowers and motor, synchronous motor, transformer blowers and motors, main transformer, compressors and alternating-current control apparatus compartment in the order named. The two control apparatus compartments are completely enclosed and apparatus can be reached only by opening doors or taking off covers. The louvers are placed in the cab

sides opposite the control apparatus compartments. This is done so that any rain that may be forced through the louvers will hit only the sheet steel covering the compartments and then run down to the floor of the cab. Also, because of the heavy snowstorms that are experienced in the Cascade Mountains, the louvers are so made that they can be closed during the storms. Movable vanes in the roof of the cab are provided which allow the air discharged from the converting machinery to be disseminated inside the cab, when the louvers are closed, instead of being emitted through the roof hatches as is done normally. The interior of the engineman's com-



Traction Motor Nose Suspension

partment is insulated with cork in order to make him comfortable during extremely cold weather.

The roof is made of No. 8 tank steel and has three separate hatches to facilitate the removal of the converting apparatus and compressors from the cab.

Although the speed of the locomotive at the continuous rating is only 18.6 miles per hour, the trucks have been so designed that the locomotive may be run at a much higher speed and still retain good riding qualities. A speed of 45 miles per hour was attained on the test track and at this speed the riding qualities of the locomotive were exceptionally good.

The side frames, end frames, air ducts, and transoms of each driving truck are combined in a single steel casting which, together with the articulated joint, take all buffing and hauling stresses. The complete trucks are mounted on semi-elliptic springs equalized in four groups arranged so as to give three-point suspension to each truck. The two axles on each truck nearest the articulated joint are side-equalized only, thus forming suspension at two points, while the outside driving axle on each truck is equalized to the center plate of its adjoining guiding truck which gives the equivalent of the single point suspension.

Provision is made for lubricating most of the wearing parts on the trucks by means of the Dot system of lubrication.

Converting Apparatus

An air-blast transformer is used to transform the current collected at the trolley from 11,000 volts to 2,300 volts. Two blowers, each driven by a single-phase repulsion motor, supply air to the transformer. In case of the failure of one blower, the other will deliver sufficient air to the transformer under ordinary conditions, though indicating lights are installed in the engineman's compartments to inform him of such failure.

The motor-generator set is comprised of five units mounted on two shafts, three units being mounted on

one shaft and two on the other. The two shafts are coupled together by means of a Fast flexible coupling which allows for angular and offset misalignment. The units comprising the motor-generator set are listed according to the functions that they perform in the following order:

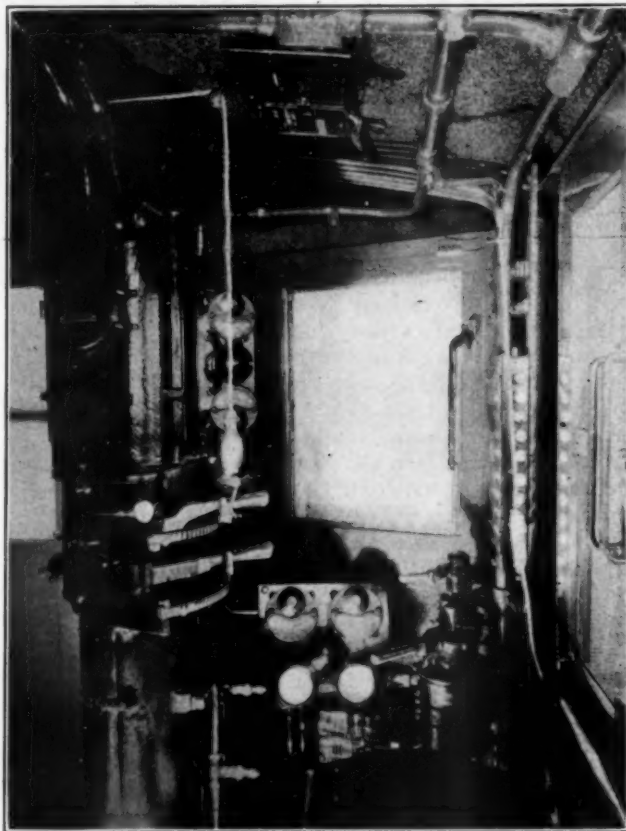
- (1) A synchronous motor operating on 2,300 volts

Electrical Characteristics

Voltage at trolley (25 cycle)	11,000
Tractive effort, one-hour rating	67,200 lb.
Horsepower, one-hour rating	3,300
Speed at one-hour rating, full field	18.2 m.p.h.
Tractive effort, continuous rating	60,500 lb.
Horsepower, continuous rating	3,000
Speed at continuous rating, full field	18.6 m.p.h.
Tractive effort at 30 per cent coefficient of adhesion	120,600 lb.
Gear ratio	21/82
Voltage at synchronous motor (single-phase)	2,300
Voltage of each of main generators (d.c.)	750
Voltage of starting motor (d.c.)	120
Voltage of main exciter (d.c.)	65
Type of control (non-automatic)	{ Electro-pneumatic Multiple-unit

and having three-phase stator windings, though designed for single-phase operation.

- (2) A 65-volt direct-current exciter that supplies the control current, the excitation for the main generators



Engineman's Position

and regenerative braking exciter, and battery charging current.

(3) Two 750-volt generators connected in series and supplying current to three groups of traction motors, each group of which consists of two motors connected in series. The magnet frames of these two generators are bolted together; and both armatures are mounted on a single shaft carried by two bearings. An extension of this shaft carries the combined starting-motor and regenerative exciter.

- (4) A combined starting-motor and regenerative ex-

citer that is used as a single-phase series motor in order to start the motor-generator set, or as a direct-current generator to excite the fields of the traction motors during regeneration.

In order to start the motor-generator set it is only necessary for the engineman to press a button situated within easy reach. The synchronous motor then synchronizes automatically in one minute, with normal voltage on the trolley.

Traction Motors

Six forced ventilated, railway-type motors are geared to the six driving axles. These motors have box frames, twin gears and commutating poles, and are supported on the axles by axle brackets and bearings and on the transoms by spring nose supports. The trucks of the locomotive are so constructed that each motor can be dropped into a pit after the removal of the journal boxes, shoes, pedestal tie bars, axle brackets, motor nose suspension springs and motor ventilator flanges.

Cushion-type gears are used in order to equalize the stresses in the gears and pinions as much as possible and to absorb the shocks which, with a solid gear and pinion, are delivered on the teeth.

Control

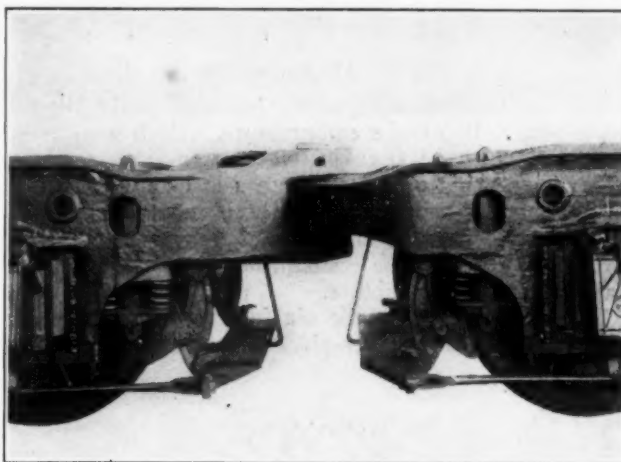
The control used is of the electro-pneumatic type arranged for non-automatic, multiple-unit operation.

Current is collected by means of two spring-raised, air-lowered, slider pantograph trolleys. Each trolley has sufficient capacity to carry full load current.

A master controller is placed in each engineman's compartment. This controller has a main cylinder with 26 notches and a braking cylinder with 16 notches. The first 24 notches of the main cylinder control the shunt fields of the two main generators, and the last two notches control the current in the traction motor field circuits. The 16 notches on the braking cylinder control the shunt field of the regenerative braking exciter. When the locomotive is motoring, the main cylinder only

New York Central Class H-10 steam locomotive. Various tests were made with the steam locomotive pushing the Great Northern locomotive; and it was found that regeneration could be established at any speed up to 40 miles an hour. The steam locomotive, with the throttle wide open, was brought down to a speed of three miles per hour by means of the regenerative braking.

There is a high-speed circuit breaker in each of the main generator circuits. These breakers not only protect the main generators but give overload and short-



Articulated Joint Between Trucks

circuit protection to the traction motors. They serve also as line breakers and can be opened and closed by means of a push-button within reach of the engineman.

Electro-magnetic contactors control the compressor motors and traction-motor blower motor. The contactors for the blower motor are actuated by push-button switches within reach of the engineman when in either operating compartment. There are no contactors in the transformer-blower motor circuits; these motors start



Class 1-C+C-1, 260-Ton, 11,000-Volt, Motor-Generator Type Electric Locomotive

is used; when the locomotive is regenerating, all of the notches on both cylinders, with the exception of the two field-shunting notches, can be used. This gives an extremely flexible control during braking; and, as each of the 26 notches of the main cylinder are running notches, the flexibility of control during motoring is also remarkably good. Regeneration is established automatically when the voltage across the main generators is equal to the voltage across the traction motors.

During the testing of the locomotive, regenerative braking operation was carried out with the help of a

up immediately as the trolley touches the overhead wire.

The heaters in each engineman's compartment are in two separate circuits, each controlled by a separate switch, so that a certain amount of heat regulation is possible.

A voltage regulator, connected in the circuit of the shunt field of the main exciter, keeps the voltage at the brushes of this exciter at 65 volts. A battery is provided of sufficient capacity to keep the lights burning in the locomotive for a reasonable length of time and to ener-

gize the necessary contactors used in starting up the motor-generator set.

In addition to the usual air gages there are various meters situated in full view of the engineman. These are the following: two direct-current ammeters, one in the traction motor armature circuit and the other in the traction motor field circuit; an alternating-current voltmeter and alternating-current ammeter, indicating the voltage and current of the synchronous motor; an equalizing voltmeter, and a speedometer.

Air operated sanders bell ringer and whistle are controlled by valves at the engineman's position.

Auxiliary Apparatus

The locomotive equipment includes two 540-volt, single-phase, two-stage compressors. Each compressor has a capacity of 100 cubic feet of free air per minute. The power supplied to the motors is taken from a tap off the main transformer and both motors are cooled by air taken from the transformer blowers. Connected to the same tap off the transformer are the heaters and transformer blower motors.

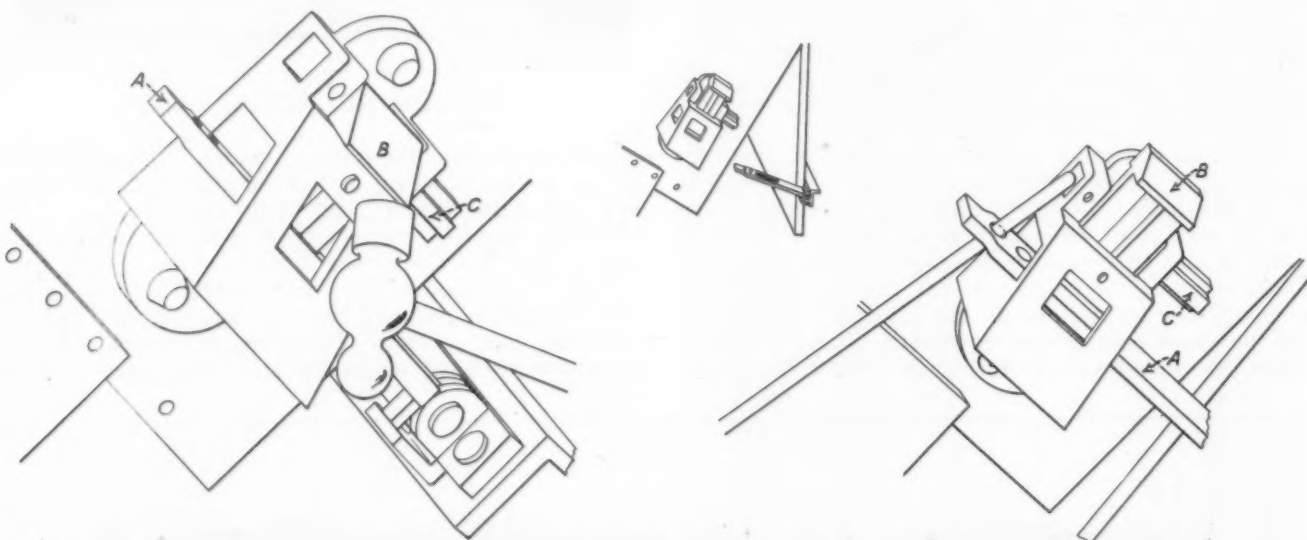
Two blowers supply the air for the six traction motors. One 720-volt, three-phase, squirrel-cage induction

and manufactured the equipment at various plants, the installation of equipment and test being made at the plant in Erie, Pa.

Door Lock for Hopper Cars

A DOOR LOCK for hopper cars, designed to facilitate the closing of the door and also to keep it in a partially open position for discharging a small amount of material from the car as it is being moved along the track, has been patented by R. E. McGahey, Master Mechanic, R. F. & P., and is being manufactured by the Midland Company, South Milwaukee, Wis. The lock is attached by rivets to each end of the hopper bottom section.

As shown in the illustration, the main casting of the device is provided with an opening through which passes the hasp *A*, the one end of which is attached to an angle iron that extends across the hopper door. The sliding lock *B* drops into properly proportioned slots cut in the hasp *A*, thus securely locking the door. The lock *B* is provided with an overhanging head to permit it to be



Left View—The Lock Applied to a Hopper Car with the Doors Closed and Locked—Middle View—The Hopper Door Entirely Open—Right View—Method of Closing the Door, Also the Means of Maintaining the Door in a Partially Open Position

motor drives both blowers. Power is obtained for this motor from the three-phase windings of the synchronous motor.

Air Brakes

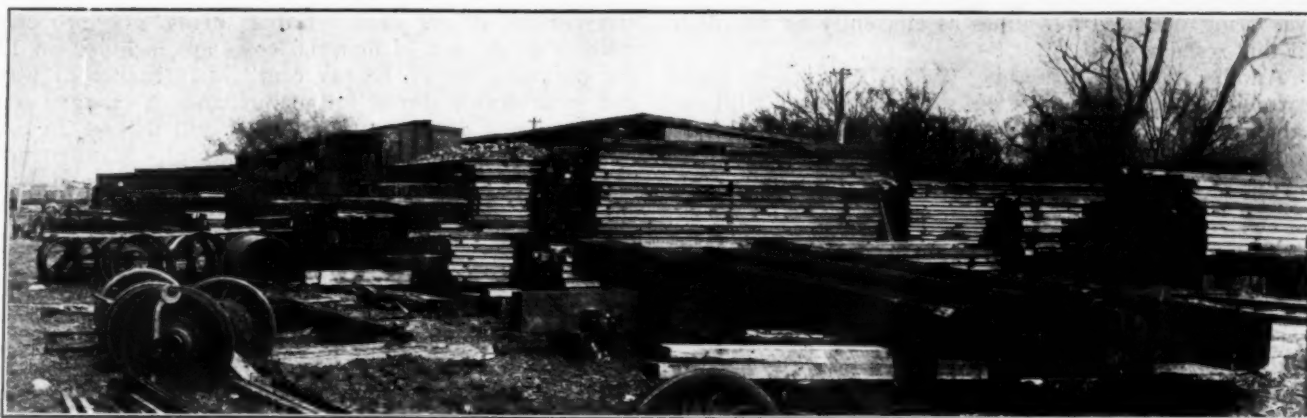
The locomotive is equipped with Westinghouse double-end, straight and automatic air-brake equipment together with air signalling equipment. Because of the regenerative feature of the locomotive, the brake equipment includes an automatic control switch and regenerative interlock. The automatic control switch insures that an emergency application of the brakes can be made at all times. The regenerative interlock prevents a service application of the brakes on the locomotive during regenerative braking but does not prevent an application of the brakes on the train.

The mechanical portions of these locomotives were built at the Schenectady Works of the American Locomotive Company. The steel castings forming the truck beds were made by the Commonwealth Steel Company. The General Electric Company designed the locomotives

driven up with a hammer, thus releasing the lock. It is provided with a slot through which a pin is inserted to limit the movement of the lock and to prevent it from working out of the lock body.

To add to the security of the lock, a tongue cut in the key *C* enters a groove in the top of lock when it is in the closed position. This key is also provided with a slot through which a pin is inserted for the purpose of limiting the movement of the key and to prevent it from being lost. As the end of the key *C* extends beyond the body of the lock, it can be readily knocked loose by a hammer.

The hasp *A* is provided with holes through which a bar is inserted to draw the car door to the closed position. The bar is also used to keep the door in a partially opened position. To open the lock the key *C* is driven out after which the lock *B* is driven up, thus leaving the hasp free. The hopper door may now be swung open or the amount of opening limited by using a bar through the holes in the hasp.



Some Roads Write Maintenance Materials Off Books While Still Unapplied, Others Keep It in Material Balance

The Neglected Science of Railway Storekeeping

More uniform material accounting a crying need of present situation

Part I

By R. A. Weston

Certified Public Accountant, New Haven, Conn.*

IN the efforts constantly being made in late years to effect every possible economy in the management of railroads, more attention is being paid to the special problems connected with materials and supplies. In particular, the members of the old organization of railway storekeepers, and of the newer organization of the Division of Purchases and Stores of the American Railway Association, have done splendid work in their committees and their conventions, and in practices which they have recommended to the railroads. This has resulted in much better conditions than prevailed 15 and 20 years ago. Yet not enough has been accomplished. The backing behind the movement is not strong enough and universal enough. The practices recommended fail in a large degree to be vigorously put into effect in any wholesale way.

Comparisons Promote Economy

Some of the most valuable lessons in economy can be learned through a comparison of a railroad's operations with those of its neighbors, and particularly with the neighbors whose conditions and characteristics most closely approximate its own. But when we come to that particular part of the operations that has to do with problems of investment in, and storage and distribution of materials and supplies, it is especially difficult to draw any really valuable and dependable conclusions from such comparisons. This is due principally to two things. One is that a proper unit of comparison has not been agreed upon, and the other is that the detailed accounting methods vary so widely on different railroads that the figures do not compare.

*Mr. Weston was formerly general storekeeper of the New York, New Haven & Hartford.

In comparing investments of one road with another, various yardsticks have been suggested. The average amount of materials and supplies per mile of track is one of these. Figures for Class I railroads in the United States for the years 1916 to 1924 show that the average investment ran from \$1,400 per mile to as high as \$3,219 per mile. In 1924, it was \$2,378 per mile. While such comparisons have value, their use is quite limited unless the group of roads compared are carefully selected and the conditions fairly similar.

Average Amount Carried

Another yardstick is the average amount of materials carried per unit of rolling stock, including locomotives and all cars. The compilation of the above figures showed this amount to be \$125 per unit in 1916, \$294 per unit in 1920 and \$138 per unit in 1924.

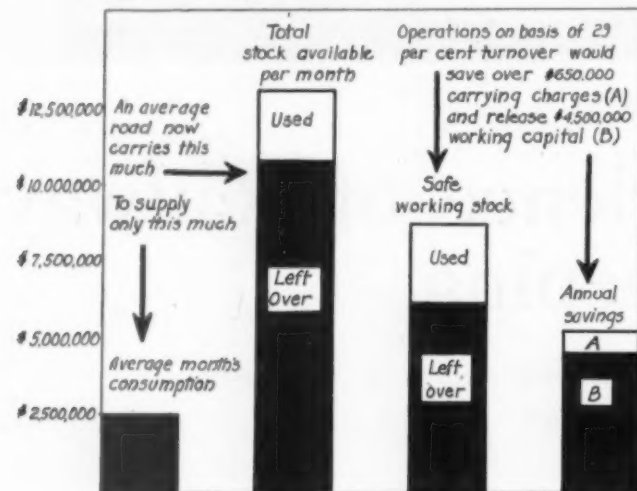
Another measure suggested is the percentage which the value of the investment bears to the operating expenses of a railway. One of the bureaus of the Interstate Commerce Commission has a formula indicating that the stock carried by each individual railway should approximate 10 per cent of its annual operating expenses. It has been shown, however, that the relationship between a railway's total operating expenses and the stock of fuel and materials carried is so variable that the use of this measure leads to undependable conclusions. The investment in materials includes a large amount for construction and betterment work, which varies at different times and on different roads, and has no bearing on the amount expended for operating expenses. Figures compiled on this basis for 1924 show that the percentage was as low as 5.38 and as high as 30.66. It would be erroneous to conclude that one road

was being operated five times as efficiently as the other in this respect.

Another measure sometimes used is the ratio to gross earnings, which is open to the same objection. Still another is the per cent of the book value of a railroad's total investment, but the logic of this is hard to understand.

Turnover the Best Yardstick

A measure that seems by far the more logical and fair is the number of times the stock is turned over in a year or the number of days' supply of material on hand. This



Charts Illustrating Average Relation Between Monthly Consumption and Supply and Proportionate Annual Savings with Better Turnover

is the measure advocated by those charged with ordering and distributing the stocks. It is also the measure used in other industries. The opinion has been expressed by the officer in charge of this investment on one of the largest railways that for maintenance of way materials, any road should be able to operate, regardless of its distance from market, with somewhere around a four month's supply, and for motive power material, excluding fuel, with somewhere around a three months' supply.

When, however, an attempt is made to compare the operations of different roads on the basis of the inventory turnover, the second obstacle is encountered. The detailed accounting methods are so different that the figures do not compare. Some of these differences, shown by information received from 47 different Class I railroads, with a total of 181,645 miles are set out below.

On 88 per cent of this mileage, the materials and supplies balance sheet account includes all maintenance of way and structures materials, while on 12 per cent it does not. This account, on 40 per cent of the mileage, includes all items of uncleared store expense while on 60 per cent it does not. Roads representing 30 per cent of this mileage include all purchased materials for which invoices have not been formally debited to the material balance and 70 per cent do not. On 60 per cent of the mileage, all cash discount invoices paid for which materials have not been received are included, leaving 40 per cent where this is not done. There is 32 per cent of the mileage where materials retired from property and equipment account before the materials are released are included, while they are not included on 68 per cent of the mileage. Postage stamps are included on 51 per cent

and not on 49 per cent. Labor items not properly chargeable as part of material costs are included on 12 per cent and not on 88 per cent. Maintenance of way and structures material for maintenance is charged out in advance of its actual application and use on 26 per cent of the mileage and not on 74 per cent. Maintenance of way and structures material for additions and betterment projects is charged out when issued on 11 per cent and not on 89 per cent. Shop material for locomotives and cars is charged out in advance of its actual application on two per cent of the mileage and not on 98 per cent. Roads representing four per cent of the mileage carry material for new roads and extensions in the Road and Equipment account and 96 per cent do not. On the same mileage basis, 20 per cent of the roads maintain working stocks of maintenance of way and structures material where the previous inventory value is carried or credited to operating expenses and 80 per cent do not. With regard to similar working stocks for repairs to freight cars 35 per cent handle this work in the same way and 65 per cent do not. Roads representing 26 per cent of the mileage handle similar stocks for passenger cars in like manner and 74 do not, while 14 per cent handle similar stocks for locomotives in the same way and 86 per cent do not. On 91 per cent of the mileage, scrap released from service is charged to material account when released and on nine per cent it is not, being charged instead to the material account when it is sold, and second hand material put into stock is carried at prices varying all the way from scrap value to the value of new material. In case of raw material issued on manufacturing orders, many roads, in arriving at system turnovers, include two and often three disbursements for raw materials used in the manufacture of finished products.

Inconsistent Accounting Costly

Is it any wonder that with such varying methods in accounting for materials it is so difficult to draw conclusions from a comparison of turnover between different railroads? If the railway accounting officers of all the railroads would agree upon, and adopt and put into effect standard accounting methods respecting the above transactions, then true comparisons and conclusions could be drawn.

The penalty being paid by railroads that are not operating closely with respect to materials and supplies is difficult to determine. The cost of carrying stocks of material has been variously calculated and estimated. Excess stocks that are finally used for the purpose for which ordered are not the most objectionable. The cost here is chiefly the interest on the investment and the cost of storing and handling. The expense lies in those stocks that remain on hand a long time and suffer appreciable losses through depreciation and deterioration, and a certain per cent of which finally becomes obsolete and often a total loss. Concerning these losses there is little reliable information. We do know that they are very large.

In an address delivered at the 37th annual meeting of the Railway Accounting Officers' Association at Atlantic City on June 10, 1925, R. M. Hudson, of the Department of Commerce, said in part as follows:

"One good reason for this increasing attention to better stores control is the cost of carrying too many varieties. When it is found that the average cost of carrying or maintaining supply stocks was 25 per cent of their value, and that obsolescence accounted for nearly one half of that cost the only logical course open was the elimination of the slow moving, the non-standard and the excessive varieties so largely responsible for that obsolescence.

In an article written in 1921, another authority put the amount of money tied up in materials and supplies roughly at three quarters of a billion dollars, or equal to \$3,000 per mile of road. Estimating the loss due to depreciation and obsolescence at 10 per cent a year and adding interest at six per cent, he arrived at a total annual carrying charge of 16 per cent. Applying this

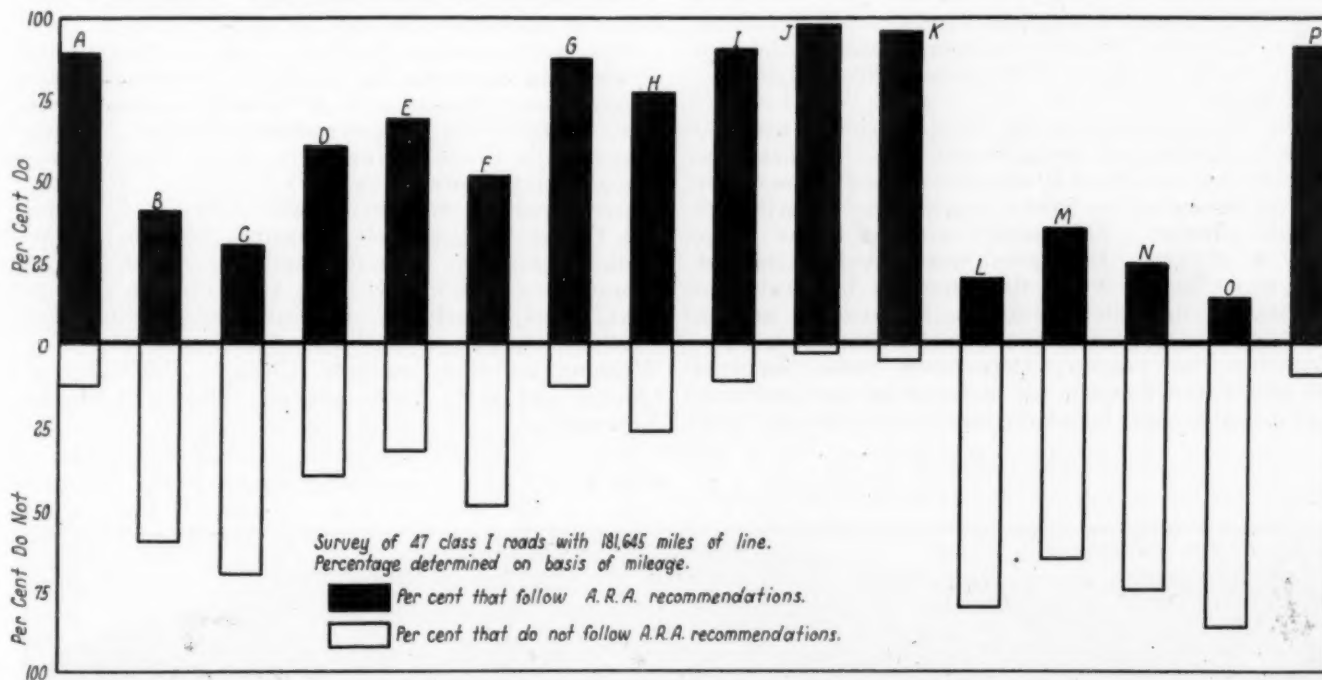
	Average carrying costs for railroad stores, per cent
Storage facilities	0.25
Insurance	0.25
Taxes	0.50
Transportation	0.50
Handling and distribution	2.50
Depreciation	5.00
Interest	6.00
Obsolescence	10.00
	25.00

to the \$3,000 in material per mile of road gave a yearly charge of \$480 per mile of road, a sum equivalent to 1.7 per cent of the operating revenues, according to which a typical road of 3,300 miles would have about \$10,-

concealed and are not disclosed in operating expense statements, which may be the reason why more attention is not paid to this problem by the executives in charge who determine the policies to be followed.

Present Turnover Low

It is true, however, that the matter is receiving more attention than formerly. In 1924 the total stocks were reduced \$122,000,000 and in 1925 the reduction was nearly \$36,000,000. In a recent article in the New York Times it was stated that the ratio of the stocks on hand of the railroads, to their annual expenditures for fuel, materials and supplies was 35.7 per cent in 1924. In other words a railroad spending \$30,000,000 annually in consumption of these items would be carrying an average inventory of \$10,700,000; that is, to provide for the average monthly consumption of \$2,500,000 an average daily inventory of over four times that amount is being carried. To state it differently, this means that with \$2,500,000 worth of material flowing in and out during a month and a balance at the end of each month of



Charts Showing the Lack of Uniformity in Stores Accounting

- A. Per cent that do and do not include all M. of W and S material in general balance sheet.
B. Status on including uncleared store expense in balance.
C. Include all purchase received on uncleared invoices.
D. Include all paid cash discount bills for material not received.
E. Include retired material only when released.
F. Include postage stamps.
G. Exclude labor items not proper material costs.
H. Include M of W and S. material for maintenance till applied.

- I. Include additions and betterment material till applied.
J. Include shop material till applied.
K. Include material for new road and extensions till used.
L. Include working stocks of M & W. material till inventory.
M. Include working stock of freight car material till inventory.
N. Include working stock of passenger car material till inventory.
O. Include working stock of locomotive material till inventory.
P. Include scrap upon its release.

000,000 of working capital invested in materials and supplies, and annual carrying charges of \$1,600,000.

Another writer has estimated the cost of carrying materials as follows:

	Per cent
Interest	5.00
Handling charges	3.00
Obsolescence	4.00
Deterioration	1.00
Accounting	
Taxes	
Insurance	2.00
Storage facilities	
Wastage	
Depreciation, etc.	
Total	15.00

This figure of 15 per cent seems conservative.

These carrying charges and losses are more or less

\$10,700,000, the amount on hand and available for use during each month would be \$13,200,000, leaving the amount used each month only 19 per cent of what was available for use.

These figures include fuel which is in a class by itself and which can be controlled so as to show a very much better ratio than the above. If fuel could be eliminated from the figures, the ratio of the balance of the material and supplies would make a considerably poorer showing than has already been indicated. If we now refer back to the statement that any road should be able to operate with approximately a four months' supply of maintenance of way and structures material this would mean that the 19 per cent would be increased

to 25 per cent. In the case of maintenance of equipment materials where a fair stock was stated to be three months the 19 per cent would be increased to 33 per cent. If the volume of these stocks were somewhat evenly divided this would make an average of 29 per cent instead of 19 per cent and a road, instead of carrying an average inventory of \$10,700,000, would be carrying an average inventory of \$6,120,000. The difference between these two inventories is \$4,580,000 and if we apply to this as a conservative figure 15 per cent to represent the annual carrying charges we get \$687,000 as representing the annual saving that would be made by eliminating these carrying charges. In addition the road would have an additional amount of \$4,580,000 of working capital to use for other purposes.

Railway Treasury Officers Association

THE twenty-first annual meeting of the Railway Treasury Officers Association was held on September 1 and 2 at the Book-Cadillac Hotel, Detroit, Mich.

The Thursday session was occupied chiefly with reports of standing and special committees. The most important topic considered by the convention was the report and recommendation of the Committee on Collection of Freight Charges. This subject has been active for a number of years. Legislation was passed by the last Congress affecting it and the committee is working to clarify the situation in order to preserve the benefits which now obtain under the Transportation Act. The Committee on Treasury Department Forms reported the adoption of the principle of simplified and standardized bankable paper by a large number of railroads. This

campaign has been carried on in conjunction with the Department of Commerce. Complete standardization in this matter is hoped for in the near future.

The joint report of the Conference Committee and the Committee on Settlement of Inter-Company Balances dealt with the effort to effect the adoption by railroads of the method of settling miscellaneous bills, such as car repair and other bills, by a single monthly voucher instead of by a number of vouchers. This question has been the subject of a conference with a committee from the Railway Accounting Officers Association, and it is hoped that the principle will be generally adopted without undue delay.

The Committee on Uniform Shippers' Order Bonds is working out a form of bond for general adoption by railroads to be filed by shippers where the original bill of lading is not available at the time of the delivery of the freight. Uniformity in regulations covering the handling of bonds of this character is considered highly desirable.

The Friday session was featured by an address by T. S. Forward of Detroit who spoke on "Income Tax Payments at the Source."

The annual election resulted in the selection of the following to constitute the executive committee for the ensuing year: President, H. P. Conner, assistant treasurer, Pennsylvania; vice-president, Charlton Messick, treasurer, St. Louis Southwestern; R. N. Harry, assistant general treasurer, New York Central; O. M. Longnecker, treasurer, Southern Pacific Lines in Louisiana and Texas; M. Middleton, treasurer, Southern; T. W. Mathews, assistant treasurer, Seaboard Air Line; Carl Nyquist, vice-president, secretary and treasurer, Chicago, Rock Island & Pacific; C. M. Scott, assistant treasurer, Southern Pacific; J. G. Walsh, treasurer, Erie; A. T. Williams, assistant treasurer, Chicago, Burlington & Quincy, and J. A. Yates, general treasurer, Canadian National.

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Underwood & Underwood

The Horseshoe Curve on the Great Northern

Traveling Engineers Conclude Annual Meeting

Addresses by R. H. Aishton, T. C. Powell and George F. Hess—Safety work featured at one session

AT the last three sessions of the Traveling Engineers' Association convention, held at the Hotel Sherman, Chicago, September 13 to 16 inclusive and partially reported on page 536 of the *Railway Age* of September 17, addresses were made by R. H. Aishton, president of the American Railway Association, T. C. Powell, president of the Chicago & Eastern Illinois, and George F. Hess, superintendent of motive power of the Wabash. One session was devoted to a discussion on safety work, led by Charles E. Hill, general safety agent of the New York Central. A paper summarizing the development of Diesel engine-driven railroad equipment on the Canadian National was presented by A. N. Boyd, road foreman of engines. A report on the value of back pressure gages and limited cutoff was read by A. T. Pfeiffer, chairman of the committee and road foreman of engines of the New York Central, Lines East.

Election of Officers

Just before adjournment at the closing session, the following officers were elected for 1927-28: President, J. D. Heyburn, master mechanic, St. Louis-San Francisco, Ft. Smith, Ark.; first vice-president, James Fahey, traveling engineer, Nashville, Chattanooga & St. Louis, Nashville, Tenn.; second vice-president, Ralph Hammond, road foreman of engines, New York, New Haven & Hartford, Providence, R. I.; third vice-president, A. N. Boyd, road foreman of engines, Canadian National, Montreal, Que.; fourth vice-president, H. B. Kelly, general road foreman of engines, Pittsburgh & Lake Erie, McKees Rocks, Pa.; fifth vice-president, J. M. Nicholson, fuel conservation engineer, Atchison, Topeka & Santa Fe, Topeka, Kans. David Meadows, assistant master mechanic of the Michigan Central at St. Thomas, Ont., was re-elected treasurer. Two new members were elected to the executive committee, J. P. Stewart, general supervisor of air brakes, Missouri Pacific, St. Louis, Mo., and J. N. Clark, general fuel supervisor of the Southern Pacific.

President Aishton's Address

Mr. Aishton said that some railroad problems, having been solved, are no longer with us and that their solution has resulted in a marked improvement in railroad operation, especially during the last 18 months. He commented on this improvement in the following manner:

"In 1926, new record after new record was hung up by the railroads of the United States. In the first place, the largest traffic in the history of the railroads was handled with absolute satisfaction to shippers, and with car shortage or congestion worthy of mention, and with practically no more cars in service than was the case in earlier years, when with a lesser volume of traffic, car shortages and congestion were expected at the periods of peak traffic. Taking some ten measuring units of

efficient operation and performance, we find that in no less than six of these units, each month of the year 1926 broke all previous records.

1927 Efficiency Record

"Despite the high record of efficiency attained by the railroads in 1926, preliminary reports show that for the most part a still higher record was established in the first half of 1927. In the first six months of the year, for instance, the railroads used an average of 2.45 ounces of coal for every ton of freight and equipment hauled one mile, compared with 2.58 ounces in the same period last year. This means that for every pound of coal or its equivalent used, the railroads hauled six and one-half tons of freight and equipment one mile as compared with six and one-fifth tons of freight and equipment one mile in 1926. This saving in fuel of course does not accrue solely to the railroads for it means an appreciable conservation of our national resources, the elimination of waste and a relief of productive capital into other channels."

In response to a suggestion from the president of the association, Mr. Aishton set up a mark or goal for the traveling engineers to work for as follows: "Last year's, last month's and last week's record," maintaining that continually better performance is required in order to keep the favorable opinion of a public which constantly looks for and demands improved service.

Engine Failures

Mr. Aishton dwelt at some length on the subject of engine failures and quoted a paper setting a sum slightly under \$500 as the total cost of a specific engine failure. He said that in some cases the cost of a single failure in disorganization of service and consequent injury to the railroad's reputation for furnishing safe, rapid and reliable transportation cannot be estimated. He mentioned one instance in which the failure of a locomotive in the northwest region during the war interrupted the movement of a train of food products from Minnesota to New York, delayed the shipment of these and other products to Europe and resulted in a food shortage felt by the foreign Service of Supply.

The organized co-operation of the traveling engineers in the interests of better railroad service was solicited by Mr. Aishton and, in accordance with his suggestion, a contact committee was appointed to work with the American Railway Association. This committee as appointed consisted of J. N. Clark, general fuel supervisor, Southern Pacific; B. J. Feeny, superintendent of fuel conservation, Illinois Central; W. A. Pownall, mechanical engineer, Wabash; J. P. Stewart, general supervisor air brake, Missouri Pacific; J. B. Hurley, general road foreman of engines and fuel supervisor, Wabash; A. N. Boyd, road foreman of engines, Canadian National and W. O. Thompson, equipment assistant, New York Central and secretary of the association.

At the close of his address, Mr. Aishton was unan-

imously and enthusiastically elected an honorary member of the Traveling Engineers Association.

Mr. Powell's Address

T. C. Powell, president of the Chicago & Eastern Illinois, addressed the association on the general subject of railroad management, pointing out some of the difficult problems which confront railroad executives and summing up the principal burden of management as the effort "to secure traffic and provide the facilities for handling traffic in proportion to its volume, but without wasteful expenditure for an excessive amount of equipment." While daily fluctuations in passenger and freight receipts are of interest, Mr. Powell said that "the real record of a railroad is that which is made during the entire 12 months of a year, and it is the final result of the transactions from January 1 to December 31, which is recorded in the annual report for the information of the stockholders, the bondholders and the public."

Mr. Powell called attention to the way in which machinery has replaced man-power to an unprecedented degree during recent years, many labor-saving devices and improved equipment being used on the railroads and applied to railroad operations. He said that there is no mysterious source from which a railroad company may secure sufficient funds to pay for operation and these appliances, therefore, will prove of no avail unless railroad management is successful in developing traffic to be hauled.

Mr. Powell explained the functions of the principal railroad executive officers, saying that their successes or failures come daily to the attention of the president, "whose responsibility it is to aid these officers in performing their duties to the benefit of the company and its owners. All of these responsibilities finally come to the president who is just as much concerned about the economical operation of locomotives as he is with respect to the securing of traffic, the maintenance of the railroad, the payment of bills or any other item."

Mr. Powell pointed out that while various inventions affect the railroads adversely in some cases, they return to the railroads a certain amount of business which would not otherwise be available. For example:

"The products of the farm provide about 14 or 15 per cent of the tonnage of the railroads as a whole, but a very valuable part of this traffic would not be available for transportation had it not been for the discovery of refrigeration some years ago.

"The invention of the gasoline engine has created an enormous tonnage of gasoline which is handled from the refineries to the distributing stations sometimes by tank wagons, but more largely in tank cars over the railroads. Without this invention, the gasoline would be a drug on the market or would remain in the earth as not being valuable enough to take out.

"Lumber has always been an important traffic for the railroads, but lumber is being cut out, and the force of necessity is bringing out substitutes, and waste materials that would otherwise have been destroyed are now being converted into these substitutes, furnishing also a substitute traffic for the railroads, to take the place of the lumber.

"The invention of the talking machine has built up a large business in the construction of the machines themselves and particularly in the manufacturing of cabinets and records. The mere record itself involves the manufacture of wood flour in combination with other ingredients, all of which must be transported, mostly by rail.

"The radio has superseded the talking machine in a great many homes, and new as the radio is, it has already produced a volume of business which is surprising. Batteries, for instance, move in car loads, and the construction of cabinets, similar to those used in the case of the talking machine, also constitutes a valuable tonnage.

"The airplane is regarded as a competitor of the railroad, and yet the airplane itself creates traffic through its requirements for air ports, construction plants, repair plants, gasoline stores and miscellaneous supplies. It takes from 1,000 to 1,500 carloads of material to fit up a flying field properly, and none of this would move unless the flying machine was a reality.

"Lamp black, a few years ago, was prepared only in small quantities for making paint, but now carbon black, which is almost the same thing, moves in train loads to be used in the manufacture of rubber tires. As a matter of fact, without carbon black, the present rubber tire would not be possible.

"I know you do not expect me to leave out the automobile, which has created such a change in the life, not only of the American public, but in foreign countries as well. The automotive vehicle transports a large amount of its own fuel, but in order that the vehicle itself may be put into operation, it is necessary to transport aluminum, steel, copper, lumber, rubber, leather or the substitute for leather, and a number of other items with which you are familiar."

Mr. Powell said that without invention the country itself would not only be much poorer, but in many cases there would be no traffic for the railroads. He maintained that traffic is in a constant state of flux and "the operation of a railroad, therefore, is not simply one of maintaining the physical freight and passenger train service, but it depends for its very life upon first securing a sufficient volume of freight and passengers, and then in handling the trains carrying the freight and passengers in the most economical and safe way."

Regarding long locomotive runs Mr. Powell said that "the railroads of Great Britain, some of which now operate the longest non-stop passenger train runs in the world, are arranging to extend the distance to as much as 400 miles. This is more than running the engines through with change of crews. The train makes no stops at all and carries the same crew over the entire run."

Calling attention to the fact that railroad problems are always fundamentally the same, the principal difference being in the method of solving them, Mr. Powell said that the Liverpool & Manchester, the first real railroad was a financial failure because original estimates of cost were based on the erroneous assumption that cars could be loaded to capacity in both directions and that coal would be available for fuel whereas circumstances forced the use of coke which was more expensive.

Diesel-Electrics on the C. N.

This paper, read by A. N. Boyd, road foreman of engines of the Canadian National, summarized the development of Diesel engine-driven equipment up to the present time and gave the experience of the Canadian National with this new form of motive power.

Regarding the Canadian National experience with nine Diesel electric cars equipped with Beardmore engines, Mr. Boyd said that "during 1926 these nine cars were in operation from Prince Edward Island to Alberta under three different regional general managers, necessitating the training of three separate maintenance

organizations. Several of these cars have over 100,000 miles to their credit and none has been taken to the shops for general overhauling."

The following data was quoted as the average performance for the nine cars for 1926:

Motor car-miles	451,991
Trailer car-miles	238,676
1,000 ton-miles	35,872
Average daily miles	234
Days out of service account equipment	447
Days account transportation	291
Total scheduled days	2,667
Complete failures	43
Delays not included in preceding	109
Minutes delayed	3,629
Gals. fuel oil used	127,307
Average miles per gal. fuel	3.5
Gals. per 1,000 ton-miles	3.6
Gals. lubricating oil used	6,993
Average miles per gal. lubricating oil	64.4
Gals. lubricating oil per 1,000 ton-miles .....	.19
Operating efficiency	81%
Revenue per motor car-mile	73.7 cents
Cost per 1,000 ton-mile	355.0 cents
Repairs per motor car-mile	6.5 cents
Fuel per motor car-mile	3.4 cents
Lubricants per motor car-mile	1.8 cents
Cost per motor car-mile	28.2 cents

Mr. Boyd continued as follows: "Inasmuch as the oil-electric locomotive has practically the same characteristics as the electric locomotive except that it has not the overload capacity, there is no reason why it should not operate almost continuously within the proper limits of its capacity. With the electrical equipment properly designed, lubrication and water cooling properly provided and with the fuel oil maintained reasonably uniform and thoroughly filtered, these engines should have a very high serviceability and be capable of running long distances without stop-over.

"We, on the Canadian National Railways, feel that this is very possible and are this summer extending our oil-electric cars by putting into service five more cars equipped with 300-hp. six-cylinder Beardmore engines and Westinghouse electrical equipments of arrangement suggested by our previous experience.

"In conclusion, the outlook for the use of the Diesel-electric motive power on steam railways is very hopeful and with all the engineering talent that is being expended on its development and application, our old and faithful friend, the steam locomotive, is going to feel the effects of the constantly increasing strength of this, its new competitor."

Discussion

In answer to a question, Mr. Boyd said that the Diesel engine equipment on the Canadian National has given satisfactory service under winter conditions and in some cases plowed through snowdrifts five feet deep which would have stalled steam locomotives. J. P. Stewart, Missouri Pacific, raised the question if Diesel-electric locomotives are not too slow for effective switching service. A member from the Lehigh Valley replied that a test Diesel-electric locomotive on his road proved entirely satisfactory in handling coal cars up a $3\frac{1}{4}$ per cent grade to a coal dock. He said that running switches were made with the locomotive, indicating that it was not slow.

Ralph Hammond, New York, New Haven & New Hartford, said that gas-electric cars are proving entirely satisfactory, particularly for branch line service on the New Haven and are nearly fool proof in construction and operation. He indicated the need of a dead-man control to overcome objections on the ground that the car driver is isolated in the engine room in the front of the car and out of direct contact with the conductor or baggageman. A member from the Long Island said that experience with internal combustion motor-driven equipment on the Long Island indicates

that big things are to be expected of it, particularly because of the possible greatly increased utilization as well as fuel economy. Mark Purcell, Northern Pacific, asked if means are being provided for an adequate amount of air compressor capacity to furnish braking power for mechanically driven internal combustion equipment. Another member from the Canadian National stated that the Diesel electric equipment presents no difficulty from an operating standpoint since it is easy to break in enginemen to handle the cars properly.

Back Pressure Gages and Limited Cut-off

The report on the value of back pressure gages and limited cut-off was read by A. T. Pfeiffer, chairman of the committee handling this subject and road foreman of engines of the New York Central.

With reference to the value of back pressure gages, the committee reported the results of a questionnaire sent to the mechanical officers of several railroads with the following results:

"Replies were received from 20 railroads. Of this number two reported that they used such gages, but did not have sufficient information available to warrant a reply as to definite results; two reported that they did not have such a device in service. No complete information was received as to the total number of such devices in service. Of the 18 railroads reporting the use of back pressure gages, thirteen reported using the Ashcroft duplex type, one hand registering steam chest pressure and the other registering back pressure; two roads reported using the single type registering only the back pressure; and three roads reported using the Ashton double hand gage."

Of 14 roads reporting on the value of the back pressure gage, all agreed that it is of material assistance in determining incorrect nozzle sizes; 13 roads said that it helps in determining irregularities in valve setting; 12 roads said that it enables enginemen to detect and therefore prevent the formation of a vacuum in the cylinders while drifting, thus avoiding the scoring of cylinders; nine roads said that it helps in determining reverse gear creeping. Regarding the possibility of holding the back pressure to a predetermined amount regardless of operating conditions, three roads replied in the affirmative and three in the negative, without qualification; one road said that the matter is left to the judgment of the engineman, another that higher back pressure must be used on grades, and a third replied "yes" for freight service and "no" for passenger service.

The consensus of opinion was that the back pressure gage results in fuel and water economy, enables enginemen to work locomotives to better advantage, prevents abuse of locomotives and enables traveling engineers to demonstrate more clearly how to obtain the best results with locomotives.

Regarding limited cut-off, the committee said:

"The use of limited cut-off entails no radical changes in the design of the locomotive. The principal change is the cutting of two slots known as auxiliary ports in the valve bushings. The use of limited cut-off results in economy of fuel and water with small sacrifice of starting effort and acceleration. In expansion ratio the limited cut-off locomotive approaches the compound engine, in uniformity of torque it is almost as good as the three cylinder engine and with this it combines the simplicity of the ordinary two cylinder engine; maintenance costs should be no greater.

"In nearly all cases of securing the advantages of a

new mechanism we must sacrifice some of the features of the old, in the case of a limited cut-off engine the piston pressure must be increased which in turn means an increase in the weight of reciprocating parts. When the limited cut-off engine stops in such a position as to require all the steam for starting to pass through one of the auxiliary ports, time will be required to build up a steam chest pressure equal to boiler pressure; an occurrence of this kind takes place so seldom that it does not need to be given serious consideration.

"The design features which differ from the ordinary locomotive, but which cause very small differences in weight and cost, are in increase steam lap on the valve, a small auxiliary port cut through the valve bushing at each end of the steam chest, and a change in the ratio of the combination lever to compensate for the increased steam lap."

The committee reported that from actual tests on a large eastern road, a water saving of 11 per cent to 38 per cent was effected by the limited cut-off locomotive as compared with the conventional locomotive, depending on the load and speed. The committee drew the following general conclusion:

"From this it may be safely inferred that the limited cut-off locomotive should produce a coal and water saving in heavy slow freight service of about 20 per cent and in fast freight service from 10 per cent to 15 per cent. In passenger service we do not believe there is a place for the limited cut-off because of the negative effect due to increased weight of reciprocating parts of 10 per cent, or less."

Only a small amount of information was submitted in response to the committee's questionnaire sent to 20 railroads. Four roads, however, reported using limited cut-off locomotives with substantial economies.

other commodity classifications. Coal loading declined 17,915 and ore 20,039 cars from the totals last year. Only the Pocahontas district showed a gain as compared with the loading by districts a year ago. The summary as compiled by the Car Service Division of the American Railway Association is as follows:

Revenue Freight Car Loading

WEEK ENDED SATURDAY, SEPTEMBER 10, 1927

Districts	1927	1926	1925
Eastern	209,133	222,974	209,651
Allegheny	199,439	208,532	190,458
Pocahontas	61,264	58,451	55,418
Southern	148,394	148,707	151,684
Northwestern	159,043	162,153	150,219
Central Western	135,657	147,503	141,918
Southwestern	76,542	76,678	76,151
Total West, Districts	371,242	386,334	368,288
Total All Roads	989,472	1,024,998	975,499
Commodities			
Grain and Grain Products	57,557	41,598	45,063
Live Stock	28,904	34,653	28,730
Coal	163,885	181,800	157,493
Coke	9,706	11,808	10,946
Forest Products	62,548	67,455	64,722
Ore	53,872	73,911	54,608
Mdse. L.C.L.	234,560	235,846	238,016
Miscellaneous	378,440	377,927	375,921
September 10	989,472	1,024,998	975,499
September 3	1,117,069	1,143,448	1,102,785
August 27	1,109,225	1,128,563	1,124,438
August 20	1,066,636	1,081,503	1,079,995
August 13	1,049,280	1,102,660	1,064,476
Cumulative total 37 weeks	36,618,023	36,779,474	35,673,292

The freight car surplus for the period ended September 8 averaged 175,704 cars, as compared with 214,985 cars August 31. The total included 96,207 box cars, 44,746 coal cars, 16,572 stock cars and 11,455 refrigerator cars.

Car Loading in Canada

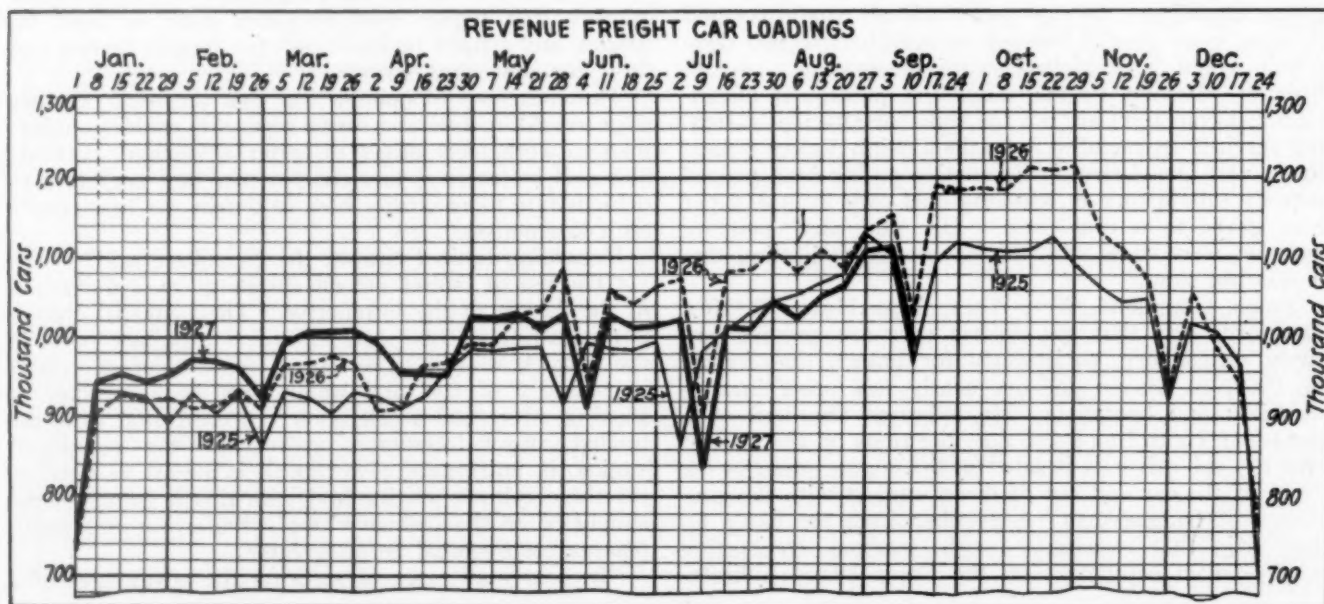
Revenue car loadings at stations in Canada for the week ended September 10 were affected by the Labor Day holiday. The total was 58,380, a decrease from the previous week of 5,387 cars and a decrease from the same week last year of 1,848 cars.

Freight Car Loading

WASHINGTON, D. C.

REVENUE freight car loading in the week ended September 10, which included the Labor Day holiday amounted to 989,472 cars, a decrease of 35,526 cars as compared with the corresponding week of 1926 and an increase of 13,973 as compared with 1925. Loadings of grain and grain products and also of miscellaneous freight were heavier than in the corresponding week of last year but decreases were shown in

Commodities	Total for Canada			Cumulative totals to date	
	Sept. 10 1927	Sept. 3 1927	Sept. 11 1926	1927	1926
Grain and grain products	5,756	4,349	9,617	234,273	234,026
Live stock	2,539	2,667	2,229	73,258	73,199
Coal	5,721	7,726	6,776	234,864	191,726
Coke	353	381	342	11,314	13,024
Lumber	3,636	4,155	3,302	136,582	131,735
Pulpwood	1,664	2,070	1,986	120,693	101,858
Pulp and paper	1,768	1,931	1,854	79,476	86,900
Other forest products	2,853	3,012	2,242	109,867	112,260
Ore	2,314	2,149	2,171	58,909	60,946
Merchandise, L.C.L.	15,817	18,228	15,324	612,637	581,348
Miscellaneous	15,959	17,099	14,385	520,283	500,153
Total cars loaded	58,380	63,767	60,228	2,192,156	2,087,175
Total cars received from connections	32,652	37,795	34,866	1,357,816	1,338,046



Louisville & Nashville

Stock has recently risen in price and now sells about 16 points higher than other 7 per cent stocks of neighbor roads

LOUISVILLE & NASHVILLE stock has, during the past two or three weeks had an increase in price of about \$9 a share. In this period it has risen to a new high of 156½ and is now selling at about 150. Inasmuch as the stock pays 7 per cent, this price gives a yield of 4.65 per cent whereas other high-grade 7 per cent stocks, such as Illinois Central and Southern Railway, with a price of approximately 134, are giving yields of 5.2 per cent. The reasons why Louisville & Nashville stock should sell at a price about 16 points higher than the stock of its two neighboring carriers, although paying the same rate of dividends, are not clear and therefore merit some analysis.

Explanation of High Price

The several factors that might explain the Louisville & Nashville's higher price would include the following: The property has, for a long period of years, earned its dividends approximately twice over and it has put back large sums into the property. This has had the effect of giving Louisville & Nashville stock great favor with investors. Inasmuch as in 1923 the company distributed a stock dividend of 45 million dollars or 62½ per cent, there is, no doubt, a certain expectation that it may decide to do the same thing again some time in the near future. The company's surplus at present amounts to 74 million dollars and is equivalent to \$63 a share on the present outstanding capital stock.

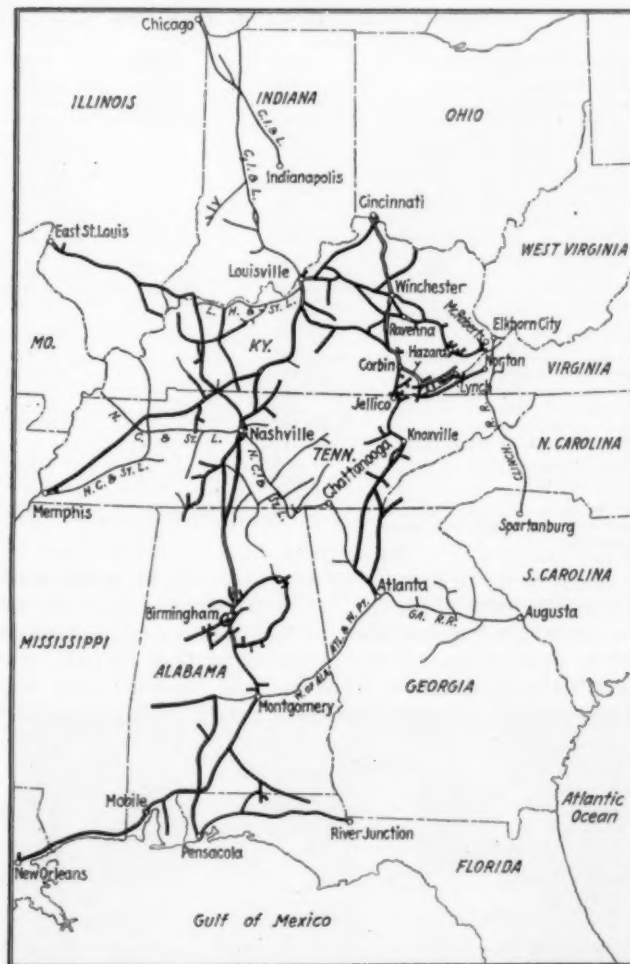
Another factor of leading importance is the comparison that might be made between the Louisville & Nashville and the prosperous Norfolk & Western and Chesapeake & Ohio, each of which, favored in the same way as the Louisville & Nashville by being carriers of non-union coal, pays 10 per cent dividends as against the Louisville & Nashville's 7. The Louisville & Nashville has benefited in remarkable degree from the situation existing in the coal industry, notably with respect to the manner in which production in the high-cost mines in Illinois has been transferred to the mines on the Louisville & Nashville, south of the Ohio river. The road, in 1926, moved 15 per cent more coal tonnage than in 1925 and 36 per cent more than in 1924 and at present is naturally benefiting greatly from the almost complete cessation of mining in Indiana and the complete stoppage in Illinois. Its coal loadings thus far this year exceed those of last year by about 9 per cent.

In addition to these factors, it is quite likely that investors are giving considerable weight to the fact that the Louisville & Nashville is controlled by the Atlantic Coast Line by the ownership of 51 per cent of its outstanding stock. It is a reasonable expectation that the day will come when there will be a closer union between the two companies in which case, considering the great prosperity of the parent company, the stockholders of the Louisville & Nashville will benefit to no inconsiderable extent.

Earnings and Dividends

The Atlantic Coast Line has had a controlling interest in the Louisville & Nashville since 1902, it having bought a 51 per cent interest at that time, purchasing \$30,600,-

000 of stock for 50 million dollars, 35 million dollars of which was paid in 4 per cent collateral trust bonds, 10 million in cash. Additional stock was acquired in 1912 and 1923 as the Coast Line's proportion of new issues. In no year since 1902 has the Louisville & Nashville dividend been less than 5 per cent and in some of the years it has been 6 or 7. The record during the last decade in this respect is particularly interesting. In the fiscal year ended June 30, 1916, the company's earnings amounted to \$19.50 a share and the dividend



The Louisville & Nashville

rate at the time was 5 per cent, although in August, 1916, it was made 7, which rate was continued for several following years.

In the calendar years 1916 and 1917, per share earnings were \$23.70 and \$22.80 respectively, ample coverage for the 7 per cent dividends and providential anticipation of the adversities of the years immediately following federal control. In 1918 and 1919, standard return enabled the company to earn over \$15 a share but in 1920 the per share earnings were only \$10.92 and in

1921 there was a deficit. In 1922, however, the per share earnings were \$14.57. It was in 1923 that the company issued its 62½ per cent stock dividend of 45 million dollars. The earnings for the year 1923 were \$11.35 per share on the new capitalization which was equivalent to \$19 a share on the former capitalization, thereby indicating remarkable recovery from the federal control years. The dividend on the new capitalization was made 5 per cent but in August, 1924, it was increased to 6 and in August, 1926, the former 7 per cent rate was restored, first by extra dividends and since in the form of regular dividends. In 1925 the Louisville & Nashville earned \$15.98 a share and in 1926, \$16.60. It appears, according to reports thus far in 1927, to be earning at the rate of about \$14.50 a share.

Coal Loadings in 1927 Increase

The following table gives a brief analysis of the degree in which the Louisville & Nashville is benefiting from the present strike in the union coal mines or from

erating revenues than in 1926. The figures for the first seven months follow:

	1927	1926	Increase or decrease
Operating revenues	\$83,789,815	\$84,864,175	—\$1,074,360
Operating expenses	66,433,060	64,782,360	1,650,700
Net operating revenues	17,356,755	20,081,815	—2,725,060
Taxes	4,029,045	4,337,149	—308,104
Railway operating income	13,318,658	15,728,267	—2,409,609
Equipment rents	Dr. 24,395	Cr. 52,858	—77,253
Joint facility rents—Dr.	275,558	170,943	104,615
Net railway operating income	13,018,705	15,610,182	—2,591,477
Ratio of operating expenses to operating revenues	79.29	76.34	.....
Ratio of net railway operating income to operating revenues	15.54	18.39	.....

In the first seven months of 1927, there was a slight decrease in the operating revenues, a slight increase in the operating expenses and a decrease of \$2,591,477 or 16½ per cent in the net railway operating income as compared with the same period of last year. The figures are not quite as good as those of last year, but the comparison is not a perfect one because the expectation at about this time last year was that the Louisville & Nash-

Table I—Louisville & Nashville Operating Results, Selected Items, 1920 to 1926

	1916	1920	1921	1922	1923	1924	1925	1926
Average mileage operated.....	5,042	5,042	5,042	5,039	5,040	5,044	5,042	5,038
Total operating revenues.....	\$60,317,993	\$127,958,737	\$117,485,777	\$121,138,840	\$136,375,673	\$135,505,677	\$142,244,307	\$147,136,530
Total operating expenses.....	39,790,481	122,910,819	107,408,938	96,604,496	109,865,090	107,126,897	108,402,256	112,462,391
Net operating revenues.....	20,527,512	5,047,918	10,076,838	21,534,344	26,510,583	23,378,780	33,842,051	34,674,140
Railway tax accruals.....	2,237,583	.....	3,494,351	4,710,724	6,372,310	6,189,994	7,049,363	7,927,642
Railway operating income.....	18,289,929	.....	6,582,487	16,810,396	19,946,272	22,154,034	26,760,119	26,722,760
Hire of freight cars, Cr., bal.	1,363,850	.....	Dr. 405,324	1,274,827	1,000,666	588,017	662,069	994,519
Dividend income	986,982	.....	1,424,997	1,135,065	1,135,142	1,292,652	1,422,271	1,837,718
Total non-operating income.....	4,456,199	.....	3,337,982	4,546,371	4,505,362	4,136,255	4,418,342	5,386,581
Gross income	22,722,075	16,877,199	9,900,128	21,356,767	24,451,635	26,290,289	31,178,461	32,109,541
Interest on funded debt.....	7,681,718	8,144,522	8,532,692	9,535,835	9,746,846	10,792,167	11,155,143	11,023,086
Total deductions from gross income	8,682,944	9,013,548	10,237,090	10,758,748	10,952,700	12,157,495	12,477,750	12,687,230
Net income	14,039,130	7,863,651	Def. 336,962	10,598,019	13,498,935	14,132,794	18,700,711	19,422,111
Dividends	4,320,000	5,040,000	5,040,000	5,040,000	5,950,000*	7,020,000	7,020,000	8,190,000
Earnings, per share.....	\$19.50	\$10.92	None	\$14.57	\$11.35	\$11.98	\$15.98	\$16.60
Revenue ton-miles (thousands).....	6,511,947	.....	8,236,443	9,090,687	10,578,359	11,204,385	12,506,101	13,292,521
Rev. per ton-mile (thousands).....	529,427	.....	685,590	669,329	767,475	710,720	681,177	663,190
Rev. per ton per mile, cents.....	0.686	.....	1.063	.998	.962	.920	.889	0.878
Tonnage of coal.....	.....	.....	.....	.....	.....	27,714,343	32,885,359	37,692,966
Total revenue tons.....	35,488,688	.....	37,120,778	43,313,908	50,502,451	51,622,181	58,076,917	63,338,178
Per cent coal of total.....	.....	.....	.....	.....	.....	53.7	56.6	59.5
Transportation ratio	29.3	.....	42.36	38.74	37.38	36.54	34.55	34.43
Operating ratio	65.97	96.2	91.42	82.22	80.56	79.06	76.21	76.43
Net railway operating income.....	.....	3,283,698	3,874,426	17,637,714	20,673,143	22,291,374	26,938,619	27,039,319
Per cent of total operating revenues .....	.....	2.6	3.3	14.6	15.3	16.5	18.9	18.4

*Does not include stock dividend of 62½ per cent, \$45,000,000, payable May 7, 1923.

the more general tendency of non-union coal to replace union production. The figures show that in only one month this year, June, have the coal loadings been less than those of the corresponding month of last year and

ville would report for the year earnings of \$19 a share. As a matter of fact, it reported only \$16.60.

Traffic—Coal

The Louisville & Nashville operates 5,038 miles of line, serving an extensive area just east of the territory along the Mississippi river served by the Illinois Central. On through traffic between the Gulf of Mexico and the Ohio river, it competes principally with the Illinois Central, the Queen & Crescent route of the Southern, with other lines of the Southern and with the Mobile & Ohio. Naturally, serving such an extensive territory, its traffic is rather diversified, outside of the predominance of the coal business. The figures for 1926 follow: Products of agriculture, 4.75 per cent; products of animals, 0.79 per cent; products of mines, 73.73 per cent; products of forests, 16.11 per cent; manufactures and miscellaneous, 12.18 per cent, and l.c.l. freight, 2.44 per cent.

The increasing importance of the coal tonnage has been mentioned previously. The percentage of coal to total tonnage in 1926 was 59.5, this having increased from 56.6 in 1925 and 53.7 in 1924. Unfortunately, it is difficult to make comparisons with earlier years in this respect because the Louisville & Nashville does not publish a classified commodity statement in its annual reports. Since the year ended June 30, 1916, the Louisville & Nashville has had an increase of 105 per cent in

Freight Loadings

	Coal		Total loadings	
	1927	1926	1927	1926
January, 4 weeks.....	62,540	61,785	127,598	131,053
February, 4 weeks.....	59,953	53,997	129,509	127,115
March, 4 weeks.....	57,889	51,478	127,940	124,643
First 3 months.....	180,382	167,260	385,047	382,811
April, 5 weeks.....	73,263	61,511	164,727	149,798
May, 4 weeks.....	57,757	50,312	130,602	120,747
June, 4 weeks.....	52,271	53,217	117,602	121,778
July, 5 weeks.....	72,526	68,397	152,362	153,838
August, 3 weeks to Aug. 20.....	47,867	43,315	97,201	93,366
Total, 33 weeks.....	484,066	444,012	1,047,541	1,022,338

that the coal loadings for the year, up to the third week in August, are 9 per cent ahead of those of 1926. In only two months this year have the total loadings of all commodities been less than in the corresponding months of last year and the increase to the third week in August is 1½ per cent.

Earnings in 1927

Notwithstanding the increase in originated traffic, the Louisville & Nashville has been reporting smaller op-

its revenue ton-miles and since a year, even as recent as 1923, an increase of 26 per cent. The volume of coal traffic is now sufficient so that the coal tonnage originating on the Louisville & Nashville lines in 1926 approximated that originating on the Baltimore & Ohio, was about nine-tenths of that originating on the Norfolk & Western and about seven-tenths of that originating on the Chesapeake & Ohio. The coal comes from areas in eastern Kentucky, southeastern Kentucky, southwestern Virginia, Tennessee, western Kentucky, the Birmingham district and there are a few mines served in southern Illinois. The Louisville & Nashville has some 600 miles of so-called mineral branches in Alabama and its coal areas along the north fork of the Kentucky river and the Cumberland river are said to offer practically unlimited possibilities for future development.

Table I in this article gives a record of the Louisville & Nashville earnings for the years 1920 to 1926 with a comparison with the pre-war year ended June 30, 1916.

per cent in gross ton-miles per train-hour will be of particular interest.

Net Ton Miles Increase

Speaking generally, it will be observed that the Louisville & Nashville has had an improvement approximately as great as that of the Southern district. However, in one respect, the Louisville & Nashville has done better and that is that it has had an increase of 43 per cent in its net ton-miles as against the Southern district's 33 per cent. In these reviews of the various railroads, it will have been observed that in almost every instance the increase in gross ton-miles has been very much in excess of the increase in net ton-miles, this circumstance usually resulting from an abnormal increase in car mileage or to a lighter average load per car or both. In the case of the Louisville & Nashville, the freight car mileage has increased in the same ratio as the net ton-miles and instead of there having been a decrease in the average load

Table II—Comparison of Selected Freight Operating Statistics

	Louisville & Nashville		Per cent of change		Southern District		Per cent of change	
	1926	1920	Inc.	Dec.	1926	1920	Inc.	Dec.
Mileage operated	5,021	.....	...	...	44,238	.....	...	...
Gross ton-miles (thousands).....	29,616,593	20,321,526	46	...	237,596,712	169,952,006	40	...
Net ton-miles (thousands).....	14,313,392	10,026,946	43	...	111,378,528	83,805,163	33	...
Freight train-miles (thousands).....	21,832	18,887	16	...	139,491	122,741	9	...
Freight locomotive-miles (thousands).....	23,724	21,226	12	...	149,986	133,667	8	...
Freight car-miles (thousands).....	721,277	503,178	43	...	5,790,844	4,130,768	40	...
Freight train-hours	1,906,872	1,773,991	7½	...	11,563,806	11,412,077	1	...
Tons of coal consumed by freight locos.....	2,750,201	2,297,286	20	...	18,536,185	16,860,253	10	...
Car-miles per day.....	31.4	30.7	2	...	36.7	30.1	22	...
Net tons per loaded car.....	33.1	30.4	9	...	31.2	30.4	3	...
Per cent loaded to total car-miles.....	59.9	65.5	...	5.6	61.7	66.7	...	5.0
Net ton-miles per car day.....	623	613	2	...	705	611	15	...
Freight cars per train.....	34.0	27.6	23	...	42.5	34.6	23	...
Gross tons per train.....	1,357	1,076	26	...	1,703	1,385	23	...
Net tons per train.....	656	531	5	...	798	683	17	...
Train speed, miles per train-hour.....	11.4	10.6	7½	...	12.1	10.8	12	...
Gross ton-miles per train-hour.....	15,532	11,455	36	...	20,546	14,892	38	...
Net ton-miles per train-hour.....	7,506	5,652	34	...	9,632	7,344	31	...
Lb. coal per 1,000 gross ton-miles.....	163	.....	...	...	138	.....	...	...
Loco-miles per loco-day.....	65.3	89.8	...	27	69.5	62.9	10	...
Per cent freight locos, unserviceable.....	14.3	19.0	...	4.7	12.8	22.2	...	9.4
Per cent freight cars unserviceable.....	4.7	11.0	...	6.3	5.0	7.5	...	2.5

The table gives striking testimony of the property's continued prosperity and of the further substantial improvement that has been made since federal control. Of further interest in this connection will be the following comparison of operating ratios as between the Illinois Central, the Southern and the roads in the Southern region.

Operating Statistics

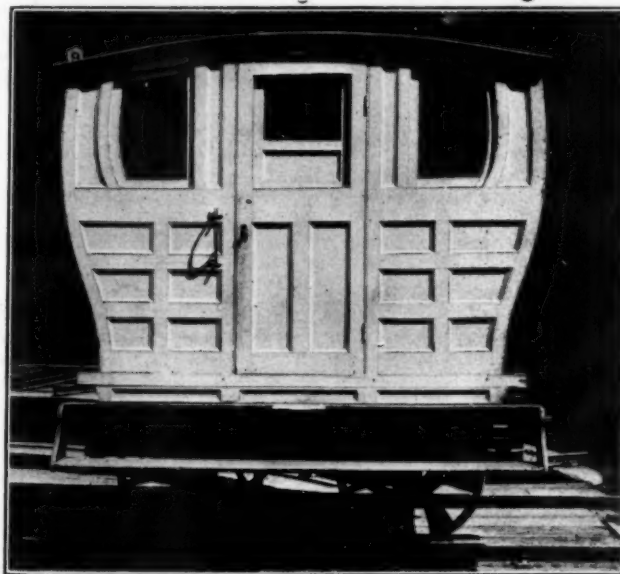
Table II is a comparison of the operating statistics in 1926 with those of 1920. For comparative purposes the figures for the Southern district are also shown. The figures for the Southern district are those of the Southern region and the Pocahontas region combined and

per car, there has been an increase. The Louisville & Nashville's better position with respect to these particular statistics is no doubt principally due to the substantial increase in the heavy loading coal tonnage.

Percentage of Total Railway Operating Revenues

	Louisville & Nashville	Illinois Central	Southern	Southern Region
Maintenance of way.....	14.76	14.87	13.55	14.6
Maintenance of equipment.....	22.45	22.34	17.24	19.4
Transportation	34.43	34.63	33.4	34.4
Total expenses	76.43	76.69	69.4	73.93
Net railway operating income.....	18.18	16.2	22.9	18.6
Earnings per share on common stock..	\$16.60	\$12.06	\$17.16	...
Dividends, per cent.....	7	7	7	...

therefore assist in setting up a high standard of comparison because of the inclusion of the Chesapeake & Ohio and Norfolk & Western. Since 1920 the Louisville & Nashville has had an increase of 46 per cent in its gross ton-miles which increased business it has handled with only 7½ per cent more freight train-hours and 20 per cent more fuel consumption. The increase of 36



An Early Passenger Car from Nova Scotia on Exhibition at B. & O. Centenary Fair

Looking Backward

Fifty Years Ago

Over 80 bids were received for the construction of the Pittsburgh, New Castle & Lake Erie [now a part of the main line of the Baltimore & Ohio] from Pittsburgh, Pa., to Harmony, 30 miles, and the contract has been let to a firm that offered to build the line complete, including three tunnels, for \$7,530 per mile.—*Railroad Gazette*, September 21, 1877.

The extension of the main line of the Burlington, Cedar Rapids & Northern [now a part of the Chicago, Rock Island & Pacific] to Albert Lea, Minn., has been completed, providing a continuous line from Burlington, Iowa, to Albert Lea, 252 miles. Connection through to Minneapolis and St. Paul will be made with the completion of the Minneapolis & St. Louis extension south to Albert Lea, Minn.—*Railroad Gazette*, September 21, 1877.

The pooling arrangement for west-bound freight between the four seaboard trunk lines has now been in operation three months and it is stated that the net earnings of the lines involved will reach a total of \$2,300,000 for the current year. It is probable that a similar pooling plan will be adopted for east-bound freight. The bitter competition of 1876 cut rates so that net earnings on west-bound freight for the same four lines were less than \$300,000.—*Railway Age*, September 27, 1877.

Twenty-Five Years Ago

W. J. Harahan, heretofore chief engineer of the Illinois Central has been appointed assistant general manager, with headquarters as before at Chicago.—*Railway Age*, September 26, 1902.

One of the most complicated and dangerous grade crossings of railways and streets in the world—that at Grand Crossing, Chicago, is to be abolished by voluntary action of the railways involved—the Pennsylvania, the New York, Chicago & St. Louis, the Illinois Central, the Lake Shore & Michigan Southern and the Baltimore & Ohio—at a cost of more than \$3,500,000.—*Railway Age*, September 26, 1902.

The Illinois Central will begin operation of a new line between Chicago and St. Paul via Dubuque, Iowa, and Albert Lea, Minn., in connection with the Minneapolis & St. Louis, on November 2, providing the I. C. with a through-route from the Twin Cities to New Orleans. Another new route from the North into New Orleans will be available when the Missouri Pacific completes construction of the Memphis, Helena & Louisiana between Memphis and New Orleans.—*Railway Age*, September 26, 1902.

Ten Years Ago

W. W. Atterbury, vice-president of the Pennsylvania, on leave of absence, has been appointed director general of transportation of the United States expeditionary force now in France.—*Railway Age Gazette*, September 21, 1917.

Harry E. Byram, vice-president in charge of operation of the Chicago, Burlington & Quincy, will be elected president of the Chicago, Milwaukee & St. Paul at a meeting of the board of directors of that company the latter part of this month. He will then have risen in eight years from a general superintendent to president.—*Railway Age Gazette*, September 21, 1917.

The suspended span of the Quebec cantilever bridge over the St. Lawrence river was successfully hoisted into place on September 20. No accidents, such as those which occurred in 1906 and 1916, resulting in the destruction of a major portion of the bridge each time, marred the completion of the structure, which spans a clear distance of 1,800 ft.—the longest span in the world between main piers.—*Railway Review*, September 22, 1917.

New Books

Great Western Railway of England, 1837-1897. 5½ in. by 8½ in. 24 pages. Illustrated. Bound in paper. Published by the railway at London.

This attractively printed booklet is a souvenir, published by the Great Western Railway of England in connection with the centenary exhibition and pageant of the Baltimore & Ohio, to be held at Baltimore from September 24 to October 8. It describes in some detail the Great Western's locomotive exhibits at Baltimore, i.e., the historic "North Star" and the modern "King George V." In addition, it gives some historical details concerning the Great Western, telling of points of interest to tourists in the territory it serves, and utilizes the slogan: "The quickest route, New York to London, via Plymouth." In addition to many handsome illustrations and decorations, it includes a large map of the territory served by the Great Western Railway.

Books and Articles of Special Interest to Railroaders

(Compiled by Elizabeth Cullen, Reference Librarian, Bureau of Railway Economics, Washington, D. C.)

Books and Pamphlets

Directory of Commercial Testing and College Research Laboratories, compiled by U. S. Bureau of Standards. Its Miscellaneous publication No. 90 presenting a classified list of the commodities that 207 commercial laboratories and 143 college laboratories are equipped to test, and the location of the laboratories. 39 p. Pub. by U. S. Govt. Print. Off., Washington, D. C. 15 cents.

Freight Train Curve Resistance on a One-Degree Curve and on a Three-Degree, by Edward C. Schmidt. Univ. of Illinois Engineering Experiment Station Bulletin No. 167. 47 p. Pub. by Univ. of Illinois, Urbana, Ill., 25 cents.

Trade Agreements 1926. Bulletin of the U. S. Bureau of Labor Statistics No. 448. "Railroads" p. 144-173. 204 p. Pub. by U. S. Govt. Print. Off., Washington, D. C., 30 cents.

Transportation on the Ohio River System (Interim Report), prepared by the Board of Engineers for Rivers and Harbors, War Department in co-operation with the U. S. Shipping Board. Includes maps and graphs showing extent of system, financial results and so on. 22 p. Pub. by U. S. Govt. Print. Off., Washington, D. C., 15 cents.

Periodical Articles

The American Merchant Marine, by Robert Dollar. What it is doing and what it can do under given conditions. *Atlantic Monthly*, September 1927, p. 390-394.

Economic Factors in the Changing Distribution of Population Between Urban Centres and Rural Areas, by E. W. Shanahan. Railways are of course a factor, and their effects are discussed on page 400. *Economic Journal*, September 1927, p. 395-403.

Locomotive Crank Axles, by H. A. F. Campbell. Their history and modern designs. Illustrations and diagrams. *Baldwin Locomotives*, October 1927, p. 42-45.

Railroad Valuation and the Investor. A general consideration of the history of valuation and probable effects if certain bases are adopted. *United States Investor*, September 10, 1927, p. 1, 3.

Tare and Load Compared in Modern Locomotives and Rolling Stock, by A. M. Bell. A paper on special problems of motive-power and equipment design that is not too technical to be understood by laymen in such matters while the accompanying pictures of old and new equipment will interest collectors of them. *Journal of the Institution of Locomotive Engineers*, May-July, 1927, p. 398-422, with discussion p. 422-438.

Odds and Ends of Railroading

The Missionary Baptist Church of Montgomery, Ala., calls itself a railway church and quite rightly, since, of its 1,640 members, 1,200 are railway employees, their wives, sons or daughters. The Atlantic Coast Line claims 500 members, the Louisville & Nashville 300, the Western of Alabama 300, and the Mobile & Ohio 100.

A story of the British general strike has just filtered across to this side. It seems that one of the volunteer drivers of the London-Liverpool express performed the truly remarkable feat of bringing the train into Lime Street Station 25 minutes ahead of time. The passengers went forward in a body to thank him. A pale green face emerged from the cab. "Don't thank me," he gasped, "thank your lucky stars; I only found out how to stop this thing five minutes ago."

There must be something about the railway business that makes men so employed good model makers. One constantly hears of railway employees who make models of all sorts as a hobby. Usually these are confined to railway subjects, but Walter G. Macdowell, chief clerk in the office of the statistician of the Chesapeake & Ohio, has gone to sea for his inspiration. He has fashioned a model of the frigate "Constitution," which has been built exactly true to scale. In its building 700 knots had to be tied and 52 guns molded from lead. All the work was done by hand by Mr. Macdowell and the model required several months to build.

The engineering department of the Boston & Maine has conducted an interesting survey of the former athletes now employed in its service. No less than 22 members of the engineering staff won letters in various colleges and universities for excellence in athletics, 5 in track, 5 in football, 4 in baseball, 2 in cross-country running, 2 in golfing and 1 each in roller polo, basketball, hockey and tennis. Eighteen who did not go to college won letters in high school athletics, 8 in baseball, 4 in basketball, 3 in football and 2 each in hockey and track. Among the women employees, the B. & M. engineering department can boast of a former captain of a high school basketball team and a district golf champion. In all, it is quite an imposing record for one department.

Five in an Upper

A passenger representative of the Chicago, Milwaukee & St. Paul is responsible for this one:

"A family of five—father, mother and three children—recently boarded one of our westbound limited trains. They were informed that only upper berths were available, and the father said, 'That's all right, we will take one.'"

"We pointed out that they would be rather crowded, all in one upper; but father decided that was all the space he wanted to pay for. So mother put the children to bed and crowded in also; followed soon after by dad.

"The conversation that drifted down from the upper was interesting, if not for publication. The last heard was 'Ma, for heaven's sake, what are we going to do up here all day tomorrow?'"

A New French Crisis

The full details of the sad case of Monsieur De Clerc have at last been made public in the American press. M. De Clerc was recently the victim of a railway accident which had distinct elements of tragedy in it. It appears that the good man, while waiting for a train at St. Ophortune, in Normandy, repaired to an adjacent field for a nap and awoke just in time to board his train as it came in. Shortly after he was seated in a compartment, he became aware that ants from the field had invaded his trousers in large numbers. Carefully locking the doors of his compartment, he drew off his trousers and held them out the window so the ants would blow away. Unfortunately, the

train was at that very moment passing a mail crane which removed the pantaloons of M. De Clerc from his frenzied clasp. It is related that M. De Clerc held the door of his compartment against all comers until he arrived at his destination, where he procured a barrel.

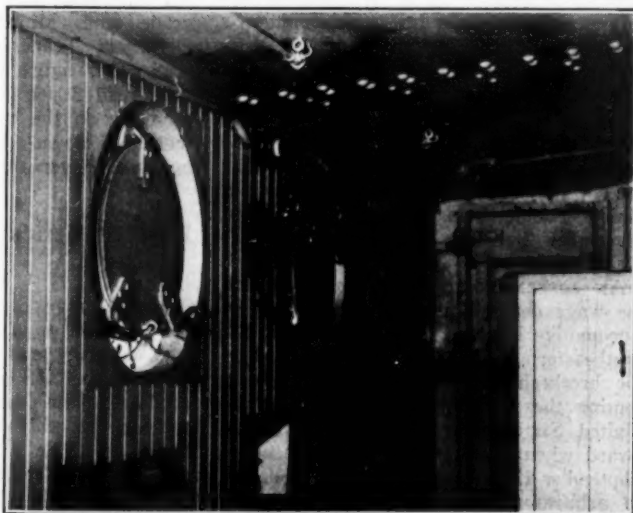
Where Handling Payrolls Is Almost as Dangerous as in a Large American City

When the employees have all been paid, Honduran paymasters evidently heave a deep sigh of relief, if one is to judge from the armored pay cars used, as shown in the accompanying illustration.



Exterior of Honduran Pay Car

tions. These are used on the railway of the Cuyamel Fruit Company in Honduras. The pay car windows are high, small and barred and the door is thoroughly barred and bolted. All ports over the windows may be closed simultaneously by throwing a



Interior of Pay Car

lever which is within easy reach of the paymaster. The interior view shows the ports closed, and the firing port for machine guns. Pay-day must be a hectic time down in Central America. The photographs are from the Frisco Magazine.



Oil-Electric Locomotive Switching in C. & N. W. Freight Yard, Chicago

THE CHICAGO, MILWAUKEE & ST. PAUL shop craftsmen have asked for a conference with officers of the road to negotiate for increases in wages. The demand, which will probably be for \$1.50 a day, will include all crafts.

COMMISSIONER HENRY C. HALL of the Interstate Commerce Commission is understood to have submitted his resignation to President Coolidge, on account of the state of his health, to take effect some time before the end of the year. Commissioner Hall has been a member of the commission since 1914.

THE ATCHISON, TOPEKA & SANTA FE has applied to the Interstate Commerce Commission for authority to operate over the line of the Denver & Rio Grande Western between Pueblo and Portland, Colo., 26 miles, and to suspend operation over its own line between those points, which has been seriously damaged by floods.

EIGHT VALUATION hearings were in progress on September 20 at Washington before examiners of the Interstate Commerce Commission, including those on the Wabash, the Philadelphia & Reading and the St. Louis-San Francisco, which have been in progress for some time; and those on the Missouri Pacific and the Missouri-Kansas-Texas, which were begun on that date. The commission has assigned the Union Pacific valuation for hearing on November 7, before Examiner Boyden.

AN AGREEMENT to submit to arbitration the wage demands of the Brotherhood of Locomotive Engineers for engineers on the southeastern railroads has been reached by the brotherhood and a committee representing the roads, after mediation by the United States Board of Mediation. The award when given is to be effective as of September 1. The brotherhood has selected as arbitrators Grand Chief Al Johnston and Assistant Grand Chief S. H. Huff, while the railroads have selected J. J. Pelley, president of the Central of Georgia and W. J. Jenks, vice-president of the Norfolk & Western. They are to meet in Washington and attempt to agree on two others.

National Association of Railroad Commissioners

James B. Walker, New York City, secretary of the National Association of Railroad and Utilities Commissioners, has issued the call for the 39th annual convention of this body, which is to be held at the Hotel Baker, Dallas, Tex., on October 18 to 21. The governor of Texas, Interstate Commerce Commissioner Esch and other prominent men are expected to address the convention. Regulation of motor vehicle carriers will be one of the subjects to be discussed by the convention, and there will be the usual reports from the standing committees.

Mallet Type Locomotive for the D. & R. G. W.—a Correction

In the description of the 2-8-8-2 type locomotives recently purchased by the Denver & Rio Grande Western from the American Locomotive Company, on page 435 of the September 3, 1927, *Railway Age*, the statement was made that the ruling grade from Minturn to the Continental Divide at Tennessee Pass was 3.33 per cent. This figure is incorrect and should have read 3 per cent. The 3.33 per cent grade is on the westbound track and is, therefore, down-grade in the direction of movement over this track.

Fuel Statistics for the Month of July

The average cost of coal used as fuel for locomotives in road service by Class I roads in July was \$2.64 per ton, as compared with \$2.58 in July of last year, according to the Interstate Commerce Commission's monthly summary of railroad fuel statistics. The average cost of fuel oil was 2.77 a gallon, as compared with 2.95 cents. For the seven months ended with July the railroads consumed 55,760,967 net tons of coal, at an average cost of \$2.66 a ton, and 1,156,052,883 gallons of fuel oil at 2.9 cents, making a total cost of \$181,967,311, as compared with \$184,607,528 in the corresponding period of last year.

Railway Fire Protection Association to Meet in Detroit

The Railway Fire Protection Association, G. S. Giles (U. P.), president, announces that its annual meeting will be held at the Hotel Statler, Detroit, Mich., October 11, 12 and 13. President R. H. Aishton, of the American Railway Association, is scheduled to address the meeting and several interesting committee reports are on the program. These include reports on the protection of materials in storehouses and material yards; the fire hazards involved in motor transportation; hazards incident to the installation, maintenance and operation of air compressors and others of equal interest. A feature of the meeting will be an open discussion of field practice of fire protection and prevention, to take up one whole day, Wednesday.

Yard Operation Discussed by Western Railway Club

The economic aspects of yard operation as influenced by the installation of power-operated retarders was the subject of a paper presented by K. E. Kellenberger of the Union Switch & Signal Company at the regular monthly meeting of the Western Railway Club, held at the Hotel Sherman, Chicago, September 19. Mr. Kellenberger's paper was illustrated with motion pictures showing the operation of the northbound Markham classification yard of the Illinois Central. He stated that the economies of this method of hump yard operation are now recognized better than ever and that today a total of 14 car retarder installations are in service or under contract. The noteworthy feature of this modern development in yard operation is its rapid adaptation to practical railroad use within a period of 2½ years. J. K. Mickley, also of the Union Switch & Signal Company, covered some of the more technical features of the Markham yard installation and during the discussion which followed the paper answered several questions. It was brought out that even under the most ideal conditions for the employment of car riders at hump yards, there is an economy in the use of the car retarder.

A. T. C. Orders Modified by I. C. C.

The Interstate Commerce Commission has granted a petition of the Galveston, Harrisburg & San Antonio and the Texas & New Orleans for authority to operate Victoria division locomotives not equipped with automatic train-control over equipped territory of the G. H. & S. A. between Gulf Junction, Texas, and Signals 2066 and 2067 at the east end of the east yard at San Antonio, Tex., approximately 2½ miles.

The commission has granted a petition of the Chicago & North Western for permission to operate certain locomotives for short distances over train control territory on its Iowa division without such locomotives being equipped with automatic train control apparatus. The commission has also granted a petition of the Chicago, Rock Island & Pacific for permission to remove the ramp displacement detectors from the train control ramps located on its Illinois division.

Safety Program for Two Months Planned

The committee on education, of the Safety Section, A. R. A., for the month of October, proposes that the safety specialists of each road concentrate attention on that item in the accident record which gives the total number of "falls of persons." In the year 1926, out of about 111,000 employees injured over 16,000 were classed as falls. This one item, therefore, accounts for about 15 per cent of all injuries to railway employees.

The committee emphasizes the point that both management and men are responsible for preventing these accidents, and the lessons for the respective sides are set down in a "parallel-column" statement as shown below.

Accompanying the circular the committee proposes the use of four large colored bulletins, each showing a sample accident which the victim might readily have avoided.

For November, the committee, changing slightly its scheme for proposing a country-wide program for each month of the year,

suggests that individual railroads prepare a circular, of local interest, each for its own employees; the idea being to give suitable information on local progress and on the "Every Year Safety Program" under which the aim is to make a reduction, in seven years from 1923, of 35 per cent in the total of casualties due to railway accidents.

As a suitable accompaniment for such circulars, the committee (issuing no general circular) has prepared a picture-poster, 17 in. x 21 in., setting forth the Spirit of Safety. Orders for these posters should be sent to J. C. Caviston, secretary, New York, before October 1.

New Haven Stock for Employees

The New York, New Haven & Hartford has notified employees that if the holders of ordinary shares and debentures do not subscribe for the whole of the seven per cent preferred stock which is soon to be issued, employees may, after October 1, buy shares on installments; in accordance with a plan similar to that by which, in 1925, the company sold to employees six per cent bonds. Employees will be asked to have one-twentieth of the value of their purchase deducted from the pay roll every month for 20 months; and interest at seven per cent will be allowed until the shares are delivered. Preference will be given to subscriptions for 10 shares or less; and, in any event, the entire allotment will be limited to 20,000 shares. The company accords this privilege as an expression of thanks for the help which the employees gave in 1925, when the company needed their assistance.

Midwest Power Conference to Be Held in Chicago

The third Midwest Power Conference will be held in Chicago on February 14 to 17. The first day will be devoted to registration and addresses covering the technical aspects of power development. The second day will be devoted to the relation of power development to flood control, and on the third day the economics of power stations will be considered, particular emphasis being placed on steam reheating and high pressure operation. A

feature of this day's program will be a symposium for public utility and manufacturing representatives to discuss "Transportation Systems in Relation to Continuity of Service." On the fourth day there will be another session devoted to the subject of economics of power stations, taking into account fuel problems.

Canadian Roads in 1926

Gross revenues earned by Canadian railways during 1926 were greater than for any other year, and, although operating expenses were heavier than in 1925 and 1924, they were less than in 1923 to 1920, inclusive, and the net revenues, totaling \$104,096,301, were the largest earned, exceeding those of 1925 by \$20,948,670, according to a preliminary summary of 1926 operations, as prepared by the Dominion Bureau of Statistics at Ottawa.

The large gains in the net revenues were made in the first half of the year, the total at the end of June being \$33,350,000, as against \$15,300,000 in 1925. Net revenues in the last six months were large, but they were also large in 1925. Freight traffic was particularly heavy during January-June, the large crop of the previous year increasing the grain traffic by 1,832,000 tons for the six months.

Passenger traffic was heavier than in 1925, both in the number of passengers carried and in the passenger miles, and passenger revenues were increased by \$2,970,984.

Operating expenses were heavier than in 1925 by \$17,353,796, maintenance of way and structures increasing by \$7,079,888, maintenance of equipment by \$5,704,332 and transportation expenses by \$3,161,356. Compared with expenses of 1924 to 1921, inclusive, transportation expenses were less by substantial amounts, and total operating expenses were only \$7,019,544 heavier than in 1924, and were less than for any other of these years.

Railway tax accruals increased from \$8,984,450 in 1925 to \$10,783,788, the taxes on the Canadian National increasing from \$2,893,424 to \$3,474,286, or by \$580,862, which included \$500,000 paid to the Maritime provinces. Previously no taxes had been paid on the old Canadian Government lines, and in 1926 an agreement was made between the provinces and the Canadian National whereby the railway agreed to pay \$250,000 per annum, retroactive to 1925. On the Canadian Pacific taxes increased from \$4,828,843 to \$5,722,082, or by \$893,239; the income tax of the Canadian Pacific amounted to \$2,000,000 for 1926.

The only other railways reporting income taxes of substantial amounts were the Canada Southern (operated by the Michigan Central), \$580,184; Pere Marquette, \$93,620, and the Toronto, Hamilton & Buffalo, \$91,823.

The payroll increased from \$237,755,752 in 1925 to \$253,412,423, of which \$225,796,455 was charged to operating expenses, the remainder, \$27,615,968, being wages paid for new construction, and charged to capital account, and salaries and wages of

(Continued on page 590)

THE MANAGEMENT

The management must take the lead, by making working conditions as safe as circumstances will permit, including:

1. Absence of stumbling hazards.
2. Adequate lighting facilities.
3. Clear vision or warnings approaching obstructions, pits, holes, etc., that cannot be removed.
4. Safe scaffolds, trestles, platforms, railings and walkways.
5. Removal of drips and splashes of water, oil and grease that create slippery steps, walks, etc., and form icy conditions in cold weather.
6. Training of men to be alert and to think of each job in terms of safety.

THIS IS MANAGEMENT'S GREAT OPPORTUNITY AND RESPONSIBILITY.

THE MEN

Regardless of what the management may or may not do, the individual employee is the one who POSITIVELY CAN PREVENT MOST OF THESE ACTS:

1. Dangerous conditions of this kind are not often created by the management, but by individuals who leave material in forbidden places or who otherwise set the stage for their own accidents or those of others.
2. Employees should not create these conditions. They should remove them or have them removed promptly, and without being told, when they find them.
3. By cultivating the habit of "looking first" and "using the head," nine-tenths of all injuries due to falls of persons will be averted.
4. Form the habit of thinking ahead of the act and, regardless of the conditions, most accidents will not occur.

Freight Operating Statistics of Large Steam Roads—Selected Items for July, 1927,

Region, road and year	Average miles of road operated	Train-miles	Locomotive-miles		Car-miles		Ton-miles (thousands)		Average number of locomotives on line daily				
			Principal and helper	Light	Loaded (thousands)	Per cent loaded	Gross. Excluding locomotive and tender	Net. Revenue and non-revenue	Servicable	Unservicable	Per cent unservicable	Stored	
New England Region:													
Boston & Albany.....1927	407	193,459	206,857	21,918	4,930	65.4	256,931	93,070	108	16	12.8	6	
1926	407	231,698	247,303	26,206	5,140	67.4	266,948	103,346	118	20	14.6	19	
Boston & Maine.....1927	2,075	464,967	526,492	49,502	11,865	70.7	599,295	240,113	274	75	21.6	31	
1926	2,143	466,715	543,064	50,865	12,537	69.8	633,184	259,307	311	88	22.0	46	
N. Y., New H. & Hartf..1927	2,140	585,277	634,870	36,367	16,181	66.5	858,351	345,401	323	64	16.5	49	
1926	2,163	581,968	611,687	38,740	16,095	67.1	848,467	346,927	318	58	15.5	29	
Great Lakes Region:													
Delaware & Hudson.....1927	875	339,392	454,091	48,936	9,680	61.9	612,412	295,393	249	34	12.0	87	
1926	875	393,491	529,479	54,557	11,107	63.9	708,449	348,990	250	36	12.6	73	
Del., Lack. & Western...1927	999	523,708	593,768	71,957	16,752	68.1	921,461	382,523	265	45	14.6	39	
1926	999	566,218	659,199	89,159	18,055	68.5	1,027,304	459,665	262	53	16.7	25	
Erie (inc. Chi. & Erie)...1927	2,317	929,116	993,704	76,827	35,933	63.3	2,146,113	868,714	413	178	30.1	34	
1926	2,323	967,344	1,061,706	119,150	36,683	64.8	2,206,067	934,596	566	109	16.1	130	
Lehigh Valley.....1927	1,345	506,813	552,023	62,439	15,631	65.7	893,592	378,751	357	97	21.4	61	
1926	1,346	593,109	652,092	71,575	18,689	64.9	1,120,669	513,203	397	81	17.0	51	
Michigan Central.....1927	1,820	562,082	577,140	23,309	18,802	60.2	1,060,670	376,614	238	61	20.4	63	
1926	1,835	577,954	594,167	20,735	19,301	61.6	1,081,500	387,141	262	48	15.4	70	
New York Central.....1927	6,478	1,829,654	2,045,145	136,997	72,049	62.6	4,330,853	1,852,807	1,126	271	19.4	385	
1926	6,482	1,988,516	2,253,166	145,474	76,000	62.8	4,598,186	2,001,063	1,214	298	19.7	401	
New York, Chi. & St. L..1927	1,665	596,989	606,242	5,818	20,282	63.9	1,118,647	412,544	235	52	18.0	60	
1926	1,665	611,280	618,108	4,655	19,638	65.8	1,074,863	418,197	237	53	18.4	51	
Pere Marquette.....1927	2,180	430,852	446,186	5,573	11,027	64.1	642,672	274,485	180	38	17.6	11	
1926	2,179	436,516	443,605	6,652	10,669	61.3	633,996	261,893	189	26	12.0	18	
Pitts. & Lake Erie.....1927	231	113,931	115,872	1,580	4,589	63.2	367,852	215,499	55	21	27.2	12	
1926	231	133,976	135,576	1,509	4,777	65.2	370,404	216,054	61	20	24.7	13	
Wabash.....1927	2,497	690,058	721,423	10,650	20,882	65.3	1,156,742	432,010	333	49	12.8	80	
1926	2,497	714,850	739,605	10,568	22,475	68.6	1,233,221	509,532	321	58	15.3	74	
Central Eastern Region:													
Baltimore & Ohio.....1927	5,540	1,970,942	2,283,844	202,639	57,297	61.5	3,825,363	1,824,865	1,049	217	17.1	130	
1926	5,519	2,042,284	2,345,812	189,984	59,735	62.4	3,938,231	1,904,173	1,069	204	16.0	151	
Central of New Jersey...1927	691	248,973	279,640	32,102	7,332	59.0	475,796	222,918	186	32	14.7	27	
1926	691	261,154	275,807	22,352	7,991	59.3	518,667	252,940	223	39	14.7	44	
Chicago & Eastern Ill....1927	945	266,033	273,986	3,504	7,060	62.4	431,574	192,211	127	46	26.5	50	
1926	945	251,853	253,354	3,940	7,283	65.1	419,416	188,847	128	37	22.2	54	
Clev., Cin., Chi., & St. L..1927	2,374	723,864	754,950	20,889	22,950	60.0	1,498,642	679,099	341	96	23.8	50	
1926	2,374	741,781	780,920	20,391	24,005	61.5	1,553,483	726,225	329	101	23.5	39	
Elgin, Joliet & Eastern...1927	461	124,014	130,420	4,657	3,503	64.2	253,393	133,370	77	14	15.5	3	
1926	460	130,015	137,271	5,112	3,917	65.2	296,169	158,163	79	14	14.8	3	
Long Island.....1927	393	44,646	47,816	12,925	544	54.6	36,706	14,321	47	10	17.2	...	
1926	393	44,851	48,808	12,435	567	54.1	37,913	14,783	44	10	19.2	...	
Pennsylvania System....1927	10,843	4,391,729	4,866,645	383,545	140,100	63.7	9,063,381	4,146,386	2,864	403	12.3	661	
1926	10,883	4,876,462	5,302,574	391,930	145,646	64.5	9,467,585	4,467,178	2,669	542	16.9	384	
Reading.....1927	1,131	581,976	627,926	58,848	15,245	59.4	1,062,090	522,038	322	77	19.2	71	
1926	1,129	613,622	668,703	62,504	16,537	61.0	1,069,158	507,256	366	66	15.4	82	
Pecahontas Region:													
Chesapeake & Ohio.....1927	2,702	1,164,610	1,251,261	47,822	38,967	56.7	3,141,510	1,700,119	548	90	14.1	48	
1926	2,650	1,262,874	1,332,045	42,593	42,264	57.5	3,460,852	1,903,341	549	100	15.4	45	
Norfolk & Western.....1927	2,232	841,460	1,017,388	37,184	29,411	58.1	2,521,813	1,303,345	562	50	8.1	155	
1926	2,231	973,809	1,185,602	53,770	34,674	58.6	2,859,443	1,570,641	589	50	7.8	139	
Southern Region:													
Atlantic Coast Line.....1927	5,090	648,568	653,912	10,525	16,604	59.4	955,267	361,357	424	56	11.7	101	
1926	4,931	846,676	858,303	14,094	21,295	59.7	1,236,581	476,435	441	49	10.0	82	
Central of Georgia.....1927	1,898	339,104	345,246	8,182	7,857	68.5	419,579	165,992	144	19	11.7	12	
1926	1,907	461,004	469,669	9,510	9,755	65.5	559,996	229,190	158	15	8.4	4	
I. C. (inc. Y. & M. V.)...1927	6,555	2,007,664	2,030,901	47,849	53,556	60.9	3,521,876	1,507,753	785	102	11.5	6	
1926	6,555	1,889,877	1,909,128	42,235	52,481	63.3	3,304,135	1,396,435	756	104	12.1	14	
Louisville & Nashville...1927	5,048	1,745,187	1,810,466	60,457	37,890	59.3	2,607,044	1,245,504	628	106	14.4	38	
1926	5,021	1,857,835	1,940,381	62,418	39,109	61.5	2,604,595	1,251,860	594	114	16.1	16	
Seaboard Air Line.....1927	4,295	542,468	549,988	5,291	13,317	62.3	760,917	294,431	239	49	17.1	36	
1926	3,904	561,368	570,990	7,007	14,122	61.3	816,626	320,719	268	26	9.0	31	
Southern Railway System.1927	8,021	1,994,915	2,022,491	34,862	50,878	64.1	2,809,245	1,099,468	1,079	144	11.8	63	
1926	8,050	2,215,856	2,249,013	38,496	53,740	63.4	3,022,688	1,195,920	1,076	157	12.8	58	
Northwestern Region:													
Chi. & North Western....1927	8,463	1,377,360	1,426,382	25,022	34,085	61.1	2,045,793	798,893	731	147	16.8	92	
1926	8,457	1,505,683	1,548,742	24,554	37,654	61.6	2,260,940	979,983	743	156	17.4	114	
Chi., Milw. & St. P.....1927	11,202	1,610,414	1,708,819	102,646	47,564	60.9	2,812,745	1,127,952	778	162	17.2	153	
1926	11,189	1,557,802	1,651,247	92,730	45,434	64.8	2,562,949	1,075,046	870	171	16.5	219	
Chi., St. P. Minn. & Om..1927	1,724	279,672	297,375	12,679	5,920	66.7	326,603	130,270	166	32	16.1	28	
1926	1,819	321,337	348,831	12,889	6,452	67.4	347,625	140,416	178	36	16.8	2	
Great Northern.....1927	8,164	767,676	790,245	47,242	28,643	61.4	1,803,123	832,886	541	147	21.4	127	
1926	8,165	773,645	799,091	46,363	29,308	63.2	1,804,860	863,327	556	153	21.6	123	
M., St. P. & S. Ste. M....1927	4,368	502,921	570,084	5,366	13,441	65.8	742,496	331,378	287	35	10.9	17	
1926	4,372	520,160	532,216	3,753	13,343	69.4	700,790	315,738	298	42	12.4	22	
Northern Pacific.....1927	6,486	790,090	833,761	42,268	24,678	69.7	1,335,549	565,400	467	150	24.3	79	
1926	6,510	812,767	857,131	48,020	26,047	66.9	1,456,367	615,179	497	147	22.8	74	
Oreg.-Wash. R. R. & Nav.1927	2,154	191,032	200,950	13,748	5,468	70.0	312,821	141,148	133	15	10.2	11	
1926	2,185	199,122	211,250	17,226	5,795	69.1	330,883	150,071	133	20	13.2	10	
Central Western Region:													
Atch., Top. & S. Fe.....1927	10,404	1,617,184	1,769,249	99,462	53,924	65.7	3,179,190	1,221,041	781	159	16.9	141	
(incl. P. & S. F.).....1926	10,240	1,948,161	2,110,131	123,172	63,571	62.7	3,931,880	1,515,197	811	134	14.2	116	
Chicago & Alton.....1927	995	304,499	329,172	2,668	7,106	58.2	443,937</						

Compared with July, 1926, for Roads with Annual Operating Revenues Above \$25,000,000

Region, road and year	Average number of freight cars on line daily			Per cent un-serv-ice-able	Gross ton-miles per train-hour, ex-cluding locomotive and tender	Gross tons per train, ex-cluding locomotive and tender	Net tons per train	Net tons per loaded car	Net ton-miles per car-day	Car miles per car-day	Net ton-miles per mile of road per day	Pounds of coal per 1,000 gross ton-miles including locomotive and tender	Locomotive miles per locomotive day
	Home	Foreign	Total										
New England Region:													
Boston & Albany.....1927	3,245	4,685	7,930	3.5	18,133	1,328	481	18.9	379	30.7	7,376	164	59.6
.....1926	2,515	5,180	7,695	5.1	14,781	1,152	446	20.1	433	32.0	8,193	167	63.8
Boston & Maine.....1927	13,906	11,243	25,149	7.0	14,670	1,289	516	20.2	308	21.5	3,733	114	53.2
.....1926	13,785	13,693	27,478	7.4	14,594	1,357	556	20.7	304	21.1	3,903	126	48.0
N. Y., New H. & Hartf.....1927	23,177	17,653	40,830	16.4	18,802	1,467	590	21.3	273	19.2	5,207	110	55.9
.....1926	20,985	21,171	42,156	17.7	17,900	1,458	596	21.6	265	18.4	5,174	116	55.8
Great Lakes Region:													
Delaware & Hudson.....1927	9,427	5,518	14,945	4.4	22,383	1,804	870	30.5	638	33.8	10,888	143	57.5
.....1926	8,427	6,602	15,029	5.7	22,174	1,800	887	31.4	749	37.3	12,863	144	66.0
Del., Lack. & Western.....1927	18,063	7,087	25,150	3.6	21,831	1,759	730	22.8	491	31.6	12,348	119	69.2
.....1926	16,084	8,153	24,237	4.6	21,805	1,814	812	25.5	612	35.1	14,838	126	76.7
Erie (inc. Chi. & Erie).....1927	36,178	18,493	54,671	6.4	27,324	2,310	935	24.2	513	33.5	12,093	122	58.4
.....1926	35,766	18,788	54,554	7.3	26,767	2,281	966	25.5	553	33.5	12,979	114	56.4
Lehigh Valley.....1927	23,351	7,864	31,215	11.1	24,874	1,763	747	24.2	391	24.6	9,081	141	43.6
.....1926	21,600	8,922	30,522	5.9	25,014	1,889	865	27.5	542	30.4	12,304	139	48.9
Michigan Central.....1927	17,693	15,282	32,975	4.4	28,384	1,887	670	20.0	368	30.6	6,677	101	64.8
.....1926	16,772	17,734	34,506	4.8	26,735	1,871	670	20.1	363	29.3	6,806	103	64.2
New York Central.....1927	72,308	69,347	141,655	4.2	29,652	2,367	1,013	25.7	422	26.2	9,226	101	50.4
.....1926	69,251	71,242	140,493	3.8	28,365	2,312	1,006	26.3	459	27.3	9,958	105	51.2
New York, Chi. & St. L.....1927	14,368	10,622	24,990	6.1	26,051	1,874	691	20.3	533	41.0	7,993	100	68.9
.....1926	13,272	10,259	23,531	7.5	23,805	1,758	684	21.3	573	40.9	8,103	100	69.2
Pere Marquette.....1927	10,131	9,313	19,444	4.0	18,806	1,492	637	24.9	455	28.6	4,061	96	65.2
.....1926	10,037	9,673	19,710	4.2	17,344	1,452	600	24.5	429	28.5	3,877	100	67.5
Pitts. & Lake Erie.....1927	14,173	7,113	21,286	4.0	35,020	3,229	1,891	47.0	327	11.0	30,034	85	50.0
.....1926	14,048	8,602	22,650	6.9	30,334	2,765	1,613	45.2	308	10.4	30,111	65	54.3
Wabash.....1927	16,976	10,913	27,889	2.8	27,191	1,676	626	20.7	500	37.0	5,581	116	61.8
.....1926	14,745	10,193	24,938	3.2	26,438	1,725	713	22.7	659	42.4	6,583	110	63.7
Central Eastern Region:													
Baltimore & Ohio.....1927	76,588	32,025	108,613	4.9	21,439	1,941	926	31.9	542	27.7	10,626	141	63.4
.....1926	70,548	34,225	104,773	4.0	20,577	1,928	932	31.9	586	29.5	11,130	147	64.3
Central of New Jersey.....1927	19,156	10,495	29,651	4.2	19,841	1,911	895	30.4	243	13.5	10,408	147	46.2
.....1926	19,343	11,123	30,466	5.3	19,840	1,986	969	31.7	268	14.3	11,810	142	36.7
Chicago & Eastern Ill.....1927	14,334	5,014	19,348	23.0	23,083	1,622	723	27.2	320	18.8	6,560	130	51.7
.....1926	13,626	4,706	18,332	19.3	22,595	1,665	750	25.9	332	19.7	6,446	121	50.4
Clev., Cin., Chi., & St. L.....1927	20,417	20,953	41,370	5.4	26,551	2,070	938	29.6	530	29.8	9,228	111	61.9
.....1926	18,884	20,946	39,830	6.2	27,118	2,094	979	30.3	588	31.6	9,868	108	60.2
Elgin, Joliet & Eastern.....1927	9,407	6,535	15,942	5.3	15,030	2,043	1,075	38.1	270	11.0	9,332	128	47.9
.....1926	9,519	7,216	16,735	5.4	15,233	2,278	1,216	40.4	305	11.6	11,092	114	49.4
Long Island.....1927	1,814	4,407	6,221	1.5	4,700	822	321	26.3	74	5.2	1,175	260	34.8
.....1926	2,070	6,203	8,273	0.8	4,771	845	330	26.1	58	4.1	1,213	270	36.4
Pennsylvania System.....1927	221,291	82,054	303,345	6.0	23,589	2,064	944	29.6	441	23.4	12,336	116	51.8
.....1926	208,868	87,248	296,116	10.2	21,577	1,941	916	30.7	487	24.6	13,241	118	57.2
Reading.....1927	28,262	11,433	39,695	2.9	20,825	1,825	897	34.2	424	20.8	14,887	144	55.6
.....1926	27,619	13,766	41,385	3.0	19,662	1,742	827	30.7	395	21.1	14,492	151	54.6
Pocahontas Region:													
Chesapeake & Ohio.....1927	30,153	13,366	43,519	3.0	31,492	2,697	1,460	43.6	1,260	50.9	20,295	88	65.7
.....1926	32,121	10,608	42,729	2.9	30,564	2,740	1,507	45.0	1,437	55.5	23,167	87	68.3
Norfolk & Western.....1927	30,425	8,815	39,240	1.3	40,226	2,997	1,549	44.3	1,071	41.6	18,840	123	55.6
.....1926	31,023	10,951	41,974	1.2	37,317	2,936	1,613	45.3	1,207	45.4	22,706	129	62.6
Southern Region:													
Atlantic Coast Line.....1927	21,835	7,552	29,387	5.2	19,819	1,473	557	21.8	397	30.7	2,290	106	44.6
.....1926	18,798	13,343	32,141	4.0	18,926	1,460	563	22.4	478	35.8	3,117	108	57.4
Central of Georgia.....1927	4,770	6,436	11,206	3.0	17,332	1,237	490	21.1	478	33.0	2,822	136	69.9
.....1926	5,098	8,705	13,803	5.3	15,594	1,215	497	23.5	536	34.8	3,877	149	89.3
I. C. (inc. Y. & M. V.).....1927	42,683	24,430	67,113	8.0	23,516	1,754	751	28.2	725	42.2	7,420	115	75.6
.....1926	40,917	24,940	65,857	4.6	22,893	1,748	739	26.6	684	40.6	6,872	119	73.1
Louisville & Nashville.....1927	43,194	17,915	61,109	10.5	18,293	1,494	714	32.9	657	33.7	7,958	134	82.3
.....1926	45,353	18,515	63,868	11.8	16,916	1,402	674	32.0	632	32.1	8,042	139	91.3
Seaboard Air Line.....1927	14,458	7,674	22,132	6.3	17,536	1,403	543	22.1	429	31.2	2,212	129	62.0
.....1926	11,266	9,702	20,968	2.3	17,381	1,455	571	22.7	493	35.4	2,650	127	63.3
Southern Railway System.....1927	57,144	23,912	81,056	5.9	19,864	1,408	551	21.6	438	31.6	4,422	140	54.3
.....1926	51,870	26,707	78,577	5.4	18,188	1,364	540	22.3	491	34.8	4,792	146	59.8
Northwestern Region:													
Chi. & North Western.....1927	49,582	29,413	78,995	8.3	18,603	1,485	580	23.5	326	22.8	3,045	119	53.3
.....1926	50,186	26,931	77,117	7.5	18,865	1,502	651	26.0	410	25.6	3,738	122	56.5
Chi., Milw. & St. P.....1927	54,494	24,569	79,063	6.6	22,253	1,747	700	23.7	460	31.8	3,248	124	62.2
.....1926	54,532	20,648	75,180	6.2	20,778	1,645	690	23.7	461	30.1	3,099	126	54.0
Chi., St. P. Minn. & Om.....1927	3,051	8,840	11,891	9.8	14,645	1,168	466	22.0	353	24.1	2,438	114	50.5
.....1926	3,181	8,267	11,448	10.4	14,055	1,082	437	21.8	396	27.0	2,490	126	54.7
Great Northern.....1927	41,408	10,998	52,406	7.3	28,569	2,349	1,085	29.1	513	28.7	3,291	109	39.3
.....1926	43,338	10,130	53,468	8.0	27,888	2,333	1,116	29.5	521	28.0	3,411	106	38.5
M., St. P. & S. Ste. M.....1927	20,688	6,910	27,598	4.7	17,411	1,476	659	24.7	395	24.3	2,447	96	52.6
.....1926	19,447	6,336	25,783	6.3	15,937	1,347	607	23.7	395	24.0	2,330	100	50.9
Northern Pacific.....1927	38,388	6,857	45,245	8.1	23,692	1,690	716	22.9	403	25.3	2,812	131	45.8
.....1926	37,381	8,057	45,438	7.4	23,385	1,792	757	23.6	437	27.6	3,048	129	45.3
Oreg.-Wash. R. R. & Nav.....1927	7,496	4,709	12,205	5.6	19,790	1,638	739	25.8	373	20.6	2,114	167	46.8
.....1926	7,798	4,911	12,709	5.3	19,845	1,662	754	25.9	381	21.3	2,215	160	48.1
Central Western Region:													
Atch., Top. & S. Fe.....1927	59,615	18,482	78,097	5.6	27,545	1,966	755	22.6	504	33.9	3,786	105	64.2
.....1926	57,554	25,093	82,647	4.8	26,532	2,018	778	23.8	591	39.6	4,764	107	76.2
Chicago & Alton.....1927	10,561	4,970	15,531	4.4</									

News of the Week

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outside operations. Some of the railways in previous years did not include wages charged to capital, also a new classification of employees was adopted; so that the data are not directly comparable with previous years.

Car Service Division Reports

No difficulty is expected by the railroads in meeting the transportation demands of the shipping public this fall, according to a report submitted at the regular fall meeting held at Chicago on September 22 to the board of directors of the American Railway Association by the Car Service Division.

The condition of freight cars and locomotives, the report said, is the best for any

of the post-war years, while the general transportation situation, so far as operation is concerned, is highly satisfactory.

Actual loading of revenue freight for the first 35 weeks this year (from January 1 to September 3) was 34,888,203 cars, a decrease of 124,713 cars, or .4 per cent, compared with the corresponding period last year, but an increase of 957,508 cars, or 2.8 per cent, over the corresponding period in 1925. Loading of coal, merchandise and less than carload, and miscellaneous freight, which account for approximately 81 per cent of the total number of cars loaded with all commodities, has been greater by about .9 per cent for the 35 weeks than for the same period in 1926 and approximately 4.5 per cent greater than in 1925. Loading of other commodities, which includes grain and grain products, livestock, coke forest products and ore, have been less for the first 35 weeks in

1927 than for the corresponding period last year. With the exception of grain and grain products, this also holds true for

Regarding the transportation situation, so far as the movement of the heavy fall traffic is concerned, the report said:

"The supply of box cars in all parts of the country has continued to be sufficient to meet all requirements, with a surplus in excess of demand. The movement of winter wheat has been handled without the slightest difficulty. Roads concerned in the movement of spring wheat are well prepared for any demand that may be made upon them. Fewer western box cars are on eastern and southeastern railroads than ever before at this time of the year, clearly indicating that these railroads are continuing their policy of complete co-operation with their neighbors in the west in the return of western box cars to meet seasonal demand in that territory.

Operating Revenues and Operating Expenses of Class I Steam Railways in the United States

Compiled from the Monthly Reports of Revenues and Expenses for 183 Steam Railways, Including 15 Switching and Terminal Companies
FOR THE MONTH OF JULY, 1927 AND 1926

Item	United States		Eastern District		Pocahontas Region		Southern Region		Western District	
	1927	1926	1927	1926	1927	1926	1927	1926	1927	1926
Average number of miles operated	238,661.58	237,915.46	59,445.39	59,542.84	5,606.87	5,604.62	39,706.87	39,318.99	133,902.45	133,449.01
Revenues:										
Freight	\$369,984,813	\$409,528,470	\$160,744,584	\$177,306,941	\$20,053,309	\$22,775,509	\$48,864,920	\$53,726,784	\$140,322,000	\$155,719,236
Passenger	a 91,633,255	b 97,893,032	48,550,815	50,537,273	1,679,274	1,892,630	10,448,887	12,375,081	30,954,279	33,088,048
Mail	7,709,086	7,816,009	2,947,160	3,007,915	191,433	202,004	1,150,356	1,178,994	3,420,137	3,427,096
Express	9,976,423	10,928,005	4,331,689	5,150,487	213,056	242,522	1,358,754	1,135,349	4,072,924	4,399,647
All other transport'n	17,409,597	18,376,988	9,976,848	10,629,181	208,508	271,298	814,789	865,600	6,409,452	6,610,909
Incidental	11,955,513	12,587,477	5,760,026	6,125,305	387,202	516,590	1,030,516	1,140,697	4,777,769	4,804,885
Joint facility—Cr.....	1,137,197	1,227,943	467,679	465,191	15,694	14,180	172,093	133,698	481,731	614,874
Joint facility—Dr.....	426,004	462,745	140,514	137,539	2,161	1,985	32,529	35,891	250,800	287,330
Ry. operat'g revenues	509,379,880	557,895,179	232,638,287	253,084,754	22,746,315	25,912,748	63,807,786	70,520,312	190,187,492	208,377,365
Expenses:										
Maintenance of way and structures	79,499,953	80,606,850	32,840,891	34,156,891	3,251,571	3,501,362	10,092,566	10,887,924	33,314,925	32,060,673
Mainten'ce of equip'm't	100,329,206	106,813,693	46,466,964	51,706,528	4,806,934	4,865,352	13,517,539	13,800,121	35,537,769	36,441,692
Traffic	10,397,189	9,889,072	3,872,595	3,628,441	281,683	241,959	1,728,203	1,626,469	4,514,708	4,392,203
Transportation	174,302,763	180,204,315	82,543,365	84,487,974	5,937,730	6,311,106	22,703,121	24,091,951	63,118,547	65,313,284
Miscellaneous operat'ns	4,984,469	5,093,692	2,213,817	2,233,768	78,697	85,840	430,203	483,245	2,261,752	2,290,839
General	15,841,096	15,373,557	7,147,696	7,029,064	559,692	508,945	2,066,044	2,010,864	6,067,664	5,824,684
Transportation for investment—Cr.....	1,638,004	1,623,491	273,932	194,985	60,502	67,274	106,370	295,171	1,197,200	1,066,061
Ry. operat'g expenses	383,716,672	396,357,688	174,811,396	183,047,681	14,855,805	15,447,290	50,431,306	52,605,403	143,618,165	145,257,314
Net revenue from railway operations	125,663,208	161,537,491	57,826,891	70,037,073	7,890,510	10,465,458	13,376,480	17,914,909	46,569,327	63,120,051
Railway tax accruals	31,987,241	34,875,806	13,659,395	14,851,411	1,722,488	1,951,011	3,975,390	4,394,984	12,629,968	13,678,400
Uncollectible ry. rev's	110,223	133,932	37,689	58,002	3,926	3,832	24,795	16,233	43,813	55,865
Ry. operating income	93,565,744	126,527,753	44,129,807	55,127,660	6,164,096	8,510,615	9,376,295	13,503,692	33,895,546	49,385,786
Equip'm't rents—Dr. bal.	7,166,636	7,340,357	3,797,945	3,869,714	d 520,610	d 608,847	104,170	399,247	3,785,131	3,680,243
Joint facility rent—Dr. balance	2,015,716	2,212,831	1,019,024	1,216,832	75,261	83,577	135,394	109,220	786,037	803,202
Net railway operating income	84,383,392	116,974,565	39,312,838	50,041,114	6,609,445	9,035,885	9,136,731	12,995,225	29,324,378	44,902,341
Ratio of expenses to revenues (per cent)...	75.33	71.05	75.14	72.33	65.31	59.61	79.04	74.60	75.51	69.71
FOR SEVEN MONTHS ENDED WITH JULY, 1927 AND 1926										
Average number of miles operated	238,349.75	237,841.65	59,442.21	59,588.55	5,562.48	5,560.19	39,578.83	39,311.21	133,766.23	133,381.70
Revenues:										
Freight	2,632,754,188	2,654,425,909	1,177,074,380	1,186,470,802	144,399,795	139,274,974	366,537,089	382,490,157	944,742,924	946,189,976
Passenger	c 570,252,744	e 602,874,348	290,113,468	298,076,612	11,993,204	12,816,462	77,443,817	93,170,804	190,702,255	198,810,470
Mail	54,808,308	55,270,638	20,892,416	20,949,864	1,423,848	1,458,916	8,174,944	8,351,265	24,317,100	24,510,593
Express	76,783,898	81,212,671	35,526,592	38,303,521	1,727,175	1,781,206	10,461,900	11,456,059	29,068,231	29,671,885
All other transport'n	118,581,018	119,802,166	67,157,255	68,464,250	1,461,663	1,534,724	6,475,458	7,130,797	43,486,642	42,672,395
Incidental	73,463,552	74,194,388	36,893,357	37,155,951	2,771,155	2,882,811	8,232,137	9,529,286	25,566,903	24,626,340
Joint facility—Cr.....	8,056,630	7,606,944	3,210,546	3,062,818	101,713	97,384	1,204,563	990,702	3,539,808	3,456,040
Joint facility—Dr.....	2,912,533	2,778,229	946,313	927,948	16,285	15,671	228,263	236,631	1,721,672	1,597,979
Ry. operat'g revenues	3,531,787,805	3,592,608,835	1,629,921,701	1,651,555,870	163,862,268	159,830,806	478,301,645	512,882,439	1,259,702,191	1,268,339,720
Expenses:										
Maintenance of way and structures	504,816,537	494,581,212	208,177,754	207,091,768	22,663,939	21,807,923	70,491,215	73,043,445	203,483,629	192,638,076
Mainten'ce of equip'm't	721,741,041	748,612,618	343,948,015	361,189,723	34,984,272	34,349,321	95,739,765	98,870,867	247,068,889	254,202,707
Traffic	70,548,217	65,852,867	25,913,190	23,857,914	1,843,867	1,715,641	12,295,510	11,855,070	30,495,650	28,424,242
Transportation	1,259,534,763	1,259,679,429	602,113,293	597,270,265	43,086,478	42,553,699	169,402,570	179,246,374	444,932,422	440,609,091
Miscellaneous operat'ns	32,416,734	32,432,490	15,024,642	14,932,321	602,892	653,175	3,801,052	4,162,138	12,988,148	12,684,856
General	111,976,252	108,145,159	50,896,639	49,734,361	3,923,707	3,528,915	14,691,547	14,036,236	42,464,359	40,845,647
Transportation for investment—Cr.....	8,404,501	8,828,068	1,514,074	1,064,133	284,498	264,511	903,847	1,719,965	5,702,082	5,779,459
Ry. operat'g expenses	2,692,629,043	2,700,475,707	1,244,559,459	1,253,012,219	106,820,657	104,344,163	365,517,812	379,494,165	975,731,115	963,625,160
Net revenue from railway operations	839,158,762	892,133,128	385,362,242	398,543,651	57,041,611	55,486,643	112,783,833	133,388,274	283,971,076	304,714,560
Railway tax accruals	217,147,636	218,491,242	89,639,378	90,438,194	12,403,234	11,150,184	28,927,955	30,461,387	86,177,069	86,441,477
Uncollectible ry. rev's	391,375	954,633	364,301	471,372	28,326	23,089	146,910	114,146	351,838	346,026
Ry. operating income	621,119,751	672,687,253	295,358,563	307,634,085	44,610,051	44,313,370	83,708,968	102,812,741	197,442,169	217,927,057
Equip'm't rents—Dr. bal.	49,547,567	46,447,772	27,910,895	26,457,012	d 3,428,335	d 4,472,444	4,717,764	8,995,369	20,347,243	15,467,835
Joint facility rent—Dr. balance	14,575,144	13,664,632	7,025,023	6,122,656	711,617	668,798	819,989	841,295	6,018,515	6,031,883
Net railway operating income	556,997,040	612,574,849	260,422,645	275,054,417	47,326,769	48,117,016	78,171,215	92,976,077	171,076,411	196,427,339
Ratio of expenses to revenues (per cent)...	76.24	75.17	76.36	75.87	65.19	65.28	76.42	73.99	77.46	75.98

a Includes \$3,537,759 sleeping and parlor car surcharge. b Includes \$3,777,287 sleeping and parlor car surcharge. c Includes \$23,254,741 sleeping and parlor car surcharge. d Deficit or other revenue items. e Includes \$23,817,457 sleeping and parlor car surcharge.

Compiled by the Bureau of Statistics, Interstate Commerce Commission. Subject to revision.

"The ability of the railroads to take care of any demands made upon them during the balance of the season in the movement of box car traffic, is evident.

"Bituminous coal production in the calendar year up to September 3 amounted to 356,475,000 tons, which is only 6,227,000 tons less than during the corresponding period last year. Production since April 1 has been at the rate of about 8,200,000 tons per week, or approximately 1,340,000 tons less than was being produced at this time last year, and is about 1,000,000 tons less than the estimated current consumption. Consumers' stocks of bituminous coal in storage as of July 1 is estimated at 62,000,000, a decrease of 13,000,000 tons since April 1, and compared with 39,000,000 tons in storage on July 1, 1926.

"Coal loading on the lines serving the Kentucky, Virginia and West Virginia fields has increased very materially in the recent past, and at the present time some of the lines serving those fields are loading more coal than at any time in their history. This has caused a general tightening in the car supply in those particular territories and action has been, and is being, taken to add to the car supply. It is not anticipated that serious difficulties will be experienced in fully protecting the requirements.

"Movement of Lake coal is progressing satisfactorily, although somewhat lighter than at this time last year, due to the unprecedented volume of movement earlier in the season. Dumpings at lower Lake Erie ports for the season to date are slightly over 4,000,000 tons in excess of the same period last year and no difficulty is anticipated in completing the season's program.

"Loading of sand, stone and gravel is running about five per cent heavier than similar loadings during the same period last year. The car supply is adequate for all requirements. Refrigerator cars are in good supply and arrangements are being made to fully protect requirements."

Manufacturers Present Exhibit

An excellent exhibit by 56 manufacturers of track materials, supplies and tools was presented in the grand ballroom of the hotel under the auspices of the Track Supply Association. The officers of this association during the past year were: President, A. H. Told, general manager, Positive Rail Anchor Company, Chicago; vice-president, J. Howard Horn, sales manager, National Lock Washer Company, Newark, N. J.; secretary-treasurer, the late W. C. Kidd, Ramapo-Ajax Corporation, Hillburn, N. Y. Following the death of W. C. Kidd on July 5, George M. Cooper of the Ramapo-Ajax Corporation, took over his duties as secretary-treasurer.

The following is a list of the companies which are presenting exhibits, together with the names of their representatives in attendance:

American Chain Company, Inc., Bridgeport, Conn.; guard rail clamps, car replacers, rail binders, one-piece guard rail, compromise joints. J. J. O'Connell and A. H. Weston.

American Fork & Hoe Co., Cleveland, Ohio; rail anchors and tapered rail joint shims. A. F. Piffard, S. L. Henderson, J. T. Reagan, E. Keough, F. C. Stowell and J. Christie.

American Hoist & Derrick Co., St. Paul, Minn.; illustrations and photographs of ditches and shovels. E. D. Kellogg.

American Steel & Wire Co., Chicago; fencing, posts, signal wire and bonds. L. P. Shanahan, T. Haskell, H. S. Lockwood and A. W. Froude.

American Valve & Meter Co., Cincinnati, Ohio; interlocking and gearless switch stand and safety locking device. John T. McGarry, J. W. McGarry, D. J. Higgins and H. Z. McGinnis.

Ames Shovel & Tool Co., Boston, Mass.; shovels and demonstration of steps in manufacture. N. E. Brooks and John S. Dodge.

Bethlehem Steel Company, South Bethlehem, Pa.; rail anchors, switch stands, hook flange guard rail and gage rods. Neil E. Salsich, R. P. Degruce, J. Toler, M. Carroll, J. L. Tygart, G. L. Moore, C. A. Alden, J. Gearhart and J. Tully.

Buff & Buff Manufacturing Co., Chicago; track liner and surfacer; R. M. Myers, William J. Buff and M. S. Jordan.

Cleveland Railway Supply Company, Cleveland, Ohio; flangeway guard, solid trough and open trough foot guards, guard rails, compromise joints, switch stands and photographs of locomotive cranes. W. H. Neeson, H. Stephens and H. P. Blum.

Crerar, Adams & Co., Chicago; hand and power bonding drills, track drills, track tools, jacks, track liners and handlers. Russell Wallace and Charles J. Grentz.

Dearborn Chemical Company, Chicago; samples of rust preventives and photographs of structures treated with it. W. D. Bennett, S. E. Moore and C. F. Berham, Jr.

Duff Manufacturing Company, Pittsburgh, Pa.; single and double-acting track jacks, tie spacer, surfacing jacks and bridge jacks. C. N. Thulin and W. G. Robb.

Edison, Inc., Thomas A., Bloomfield, N. J.; electric lighted switch lamp, cells and parts for primary storage batteries and night box for motor cars. F. S. Stallknecht, C. R. Heron and P. A. Garrity.

Electric Tamper & Equipment Co., Chicago; electric tie tamper. H. W. Cutshall and V. G. Cartier.

Fairbanks, Morse & Co., Chicago; section motor car, with windshield. P. H. Gilleland, F. M. Condit, E. P. Chase, J. L. Jones, B. S. Spaulding, F. J. Lee, E. J. Coverdale and G. W. Lewis.

Fairmont Railway Motors, Inc., Fairmont, Minn.; light inspection car, and standard inspection car, cut-away model of engine, wheel axle, roller-bearing assembly, model of trailer frame. W. D. Brooks, E. R. Mason and C. F. Green.

Hackmann Railway Supply Company, Chicago; track liner block. J. J. Franzen and Arthur Schmidt.

Hayes Track Appliance Company, Richmond, Ind.; derail and operating stand and bumping post. Herbert J. Meyer, S. W. Hayes, E. W. Brown, A. W. Boorum, E. L. Ruby and F. C. Stowell.

Hubbard & Co., Pittsburgh, Pa.; shovels, track tools and nut locks. J. S. Wincrantz and B. F. Franzier.

Ingersoll-Rand Company, New York City; pneumatic tie tamper, rail drill, nutting machine, bonding drill, concrete breaker and spike driver. W. H. Armstrong, G. W. Morrow, F. J. Ursem, T. H. Wiegand, G. E. Bridge and G. W. Winslow.

Jordan Company, O. F., East Chicago, Ind.; moving pictures of spreader and oiler. A. L. Greenbaum, J. C. Forbes, A. W. Banton, H. W. Protzeller and C. H. Staples.

Kalamazoo Railway Supply Company, Kalamazoo, Mich.; motor cars, superintendents' track gage and level. F. E. McAllister, R. E. Ke'ler, J. E. Murray and H. M. Clawson.

Keystone Grinder & Manufacturing Co., Pittsburgh, Pa.; hand and foot power tool grinders. L. J. Cooney and S. S. Newman.

Lebanon Steel Foundry, Lebanon, Pa.; steel flangeway guard. P. E. Gerhard, W. H. Worriow and A. J. McDonald.

Lundie Engineering Corporation, New York City; tie plates and rail anchors. L. B. Armstrong and Eugene Brandeis.

Maintenance Equipment Company, Chicago; switch point protector, model of friction car stop, and literature on rail and flange lubricator, power rail layer, hand rail layer, power track ballaster and steel fence post. J. A. Moffitt and J. A. Reche.

McMyler Interstate Company, Cleveland, Ohio; switch stands and literature on pile drivers and locomotive cranes. H. C. Odenkirk.

Mechanical Manufacturing Company, Chicago; model of bumping post. H. E. Johnson.

Mudge & Co., Chicago; motor cars. A. C. Force, C. P. Benning, F. C. Whitehouse, V. Pagett, J. J. Vandergrift and L. B. Ryan.

National Lock Washer Company, Newark, N. J.; spring washers. F. B. Archibald, G. La Rue Masters, W. R. Hillary and R. L. Cairncross.

Nordberg Manufacturing Company, Milwaukee, Wis.; motion pictures of track shifter and general utility machine for track work. W. W. Fitzpatrick and Victor F. Larson.

Northwestern Motor Company, Eau Claire, Wis.; transmission drive for heavy duty motor cars, light inspection car, photographs and literature on motor cars, discing equipment, gas-electric power plant and trailer, and motion picture of new discer. F. W. Anderson, J. C. King, Allen Datesman and Walter Allen.

Oxweld Railroad Service Company, Chicago; welding and cutting apparatus. L. C. Ryan, W. H. Kofmehl, J. E. Winslow, F. J. Duffie, W. E. Campbell, A. S. Jones and F. H. Lurquin.

P. & M. Company, Chicago; anti-rail creepers and bond wire protectors. D. T. Halberg, M. K. Ruppert, J. E. Mahoney, G. E. Webster, L. S. Walker, T. J. Byrne, F. N. Bayliss and S. M. Clancey.

Positive Rail Anchor Company, Chicago; girder type guard rail, rail anchors and guard rail plates and braces. A. H. Told and L. C. Ferguson.

Q. & C. Company, New York City; one-piece manganese guard rail, guard rail clamp, compromise joint, switch point guard, insulated joint, steel fence post and derails. L. T. Burwell and H. T. Henry.

Rail Joint Company, New York City; insulated joints, compromise joints, standard joints, head-free joints, reinforced joints and track liner. Alexander Chapman, D. L. Braine, H. C. Hickey, J. N. Meade, Charles Jenkinson, E. B. Bishop, W. E. Gadd, Milton Markley, V. C. Armstrong and E. A. Condit, Jr.

Railroad Accessories Corporation, New York City; power track drill, ballast bucket, signal bonding drill and "tote" bucket. S. G. Ellis and W. G. Burns.

Railroad Supply Company, Chicago; tie plates. H. M. Buck and G. T. Willard.

Railway Engineering and Maintenance, Chicago; copies of *Railway Engineering and Maintenance*, *Railway Age*, *Railway Engineering and Maintenance Cyclopedia*, *Roadway and Track*, and *Simplified Curve and Switch Work*. Elmer T. Howson, F. C. Koch, W. S. Lacher, J. M. Rutherford, J. G. Little, N. D. Howard, H. D. McCandless and W. F. Rench.

Railway Equipment and Publishing Company, New York City. H. A. Brown and B. J. Wilson.

Railway Purchases and Stores, Chicago; copies of publication. Edward Wray, W. H. Dickinson and K. F. Sheeran.

Ramapo-Ajax Corporation, Hillburn, N. Y.; automatic switch stand, double shoulder switch plate, switch clip, adjustable switch brace, guard rail clamp, forged braces and rail expander, manganese guard rail and switch point guard rail. T. E. Akers, W. Bender, George Cooper, J. E. Davidson, D. Fairback, D. F. Hilton, P. Hoffman, J. V. Houston, John Hutchins, R. W. Payne and J. B. Strong.

Rawls Manufacturing Company, Chicago; mowing machine. S. E. Rawls, N. H. Greer, J. Kranz and L. F. Ruhl.

Reade Manufacturing Company, Jersey City, N. J.; photographs showing large machines and small motor car units for spraying chemical weed killer. C. H. Reade and R. W. Pritchard.

Reliance Manufacturing Company, Massillon, Ohio; spring washers. H. J. McGinn, Robert Shireman, E. D. Cowlin, A. C. Rule, H. P. McCormick, H. R. Hanna and E. C. Gross.

Sellers Manufacturing Company, Chicago; wrought iron tie plates and wrought iron guard rail tie plates. R. A. Van Houten, George M. Hogan and R. J. Platt.

Sinning Track Liner Company, Ramsey, Ill.; track liner. F. R. Sinning, S. H. Smith and C. F. Furscher.

Skelton Shovel Company, Dunkirk, N. Y.; track shovels. E. W. McCarty, H. C. Branahl, Walter Skelton and Archie Milligan.

Synton Company, Pittsburgh, Pa.; electric tie tampers. E. D. Jackson, D. G. Black and G. A. McKee.

Teupleton, Kenly & Co., Ltd., Chicago; track jacks, bridge jacks, emergency jacks and tie spacing shoes. George Mayer, J. L. Crowley and W. M. Simpson.

Union Switch & Signal Co., Swissvale, Pa.; insulated rail joints and hand thrown switch movements. J. J. Cozzens.

Verona Tool Works, Pittsburgh, Pa.; alloy track tools, nut locks, track jacks, rail joint springs and rail anchors. W. W. Glosser, A. C. Laessig and C. G. Ericson.

Warren Tool & Forge Company, Warren, Ohio; adzes, clawbars, lining bars, picks, spike mauls, sledges, hammers, track chisels, wrenches, gages and levels. Howard Mull, E. L. Ruby, J. F. Leonard, W. S. Konold and J. R. Knold.

Western Wheeled Scraper Company, Aurora, Ill.; model of air dump car, and moving pictures and photographs. H. P. Henderson and Jesse Mossgrove.

Woolery Machine Company, Minneapolis, Minn.; motor car engines and parts. H. A. Rogers.

The following officers were elected for the ensuing year: President, J. Howard Horn, National Lock Washer Company, Newark, N. J.; vice-president, F. McAllister, Kalamazoo Railway Supply Company, Kalamazoo, Mich.; secretary-treas-

urer, A. H. Told, Positive Rail Anchor Company, Chicago; directors, W. W. Glosser, Verona Tool Works, Pittsburgh, Pa.; L. P. Shanahan, American Steel & Wire Company, Chicago; B. J. Wilson, Pocket List of Railroad Officials, Chicago, and D. J. Higgins, American Valve & Meter Company, Chicago.

Exhibitors at T. E. Convention

Notable success attended the efforts of the Railway Equipment Manufacturers' Association, which furnished the entertainment and exhibition this year in connection with the thirty-fifth annual convention of the Traveling Engineers' Association, held at the Hotel Sherman, Chicago, September 13 to 16, inclusive. One hundred and thirteen manufacturers and supply companies had their products on display in the exhibition hall and there were 14 non-exhibiting members. The manufacturers' association elected the following officers for 1927-28: President, J. F. Gettrust, the Ashton Valve Company, Chicago; first vice-president, J. J. Cizek, Leslie Company, Lyndhurst, N. J., and second vice-president, C. M. Hoffman, Dearborn Chemical Company, Chicago. Fred W. Venton, Crane Company, Chicago, was re-elected secretary-treasurer.

The following is a list of the manufacturers, products exhibited and representatives in attendance at the convention:

Air Reduction Sales Company, New York.—Oxygen, acetylene, carbide, cutting apparatus, welding apparatus and carbide lamp. Represented by E. M. Sexton, B. N. Law, R. T. Peabody, J. W. Kenefic, F. E. Rogers and T. M. Hamer.

American Arch Company, New York.—Colored moving picture showing functioning of arch. Represented by W. L. Allison, T. Mahan, A. M. Sucee, E. H. Cook, W. J. Hill, A. W. Clokey, B. A. Clement, T. Furgerson, W. E. Salisbury, W. W. Neale, G. M. Bearn, M. R. Smith, E. T. Mulcahy, G. Wagstaff, C. O. McNamee, T. F. Kilcerun, C. T. Pfeiffer, G. E. Prier and W. Haag.

American Brake Shoe & Foundry Company, Chicago.—Brake shoes. Represented by L. R. Dewey, J. W. Waters, H. W. Hurst, F. P. Biggs, W. K. Nekon and C. F. Weil.

American Locomotive Company, New York.—Railway steel springs, three-cylinder locomotive, four-wheel engine truck, power reverse gear, driving box cellars, journal box lid, wrist pin, bottom bearing driving box, hub liner, steam pipe casing, hand rail columns and pipe clamps. Represented by N. C. Naylor, S. H. Michaels, J. G. Blunt, G. G. Jones, R. Brown, A. Haller, A. L. Moler and W. S. Morris.

American Railway Appliances Company, Inc., New York.—Locomotive flue blower. Represented by A. Schneider, J. W. Henry and F. C. Porter.

American Steel Foundries, Chicago.—Models of 50 and 70-ton capacity trucks, brake beams, adjustable heads, reversible fulcrums, vertical key coupler yokes, steel wheels and locomotive grates. Represented by C. E. Grigsby, C. F. Street, W. A. Sterns, W. C. Walsh and W. G. Wallace.

American Throttle Company, New York.—Multiple valve throttle. Represented by F. A. Schaff and R. M. Osterman.

Ar-An-Ess Manufacturing Company, Chicago.—Locomotive fire door. Represented by E. H. Bauer and C. B. Royal, Jr.

Ashcroft Manufacturing Company, New York.—Cut-off control gages, steam gages, air gages, prismatic water gages and gage cocks. Represented by C. L. Brown, J. H. Bush, P. H. Ryan, J. S. Smith, J. P. Walsh and C. W. Corning.

Ashton Valve Company, The, Boston, Mass.—Locomotive safety valves, steam gages, quadruple air brake gages, locomotive pilot gages, back pressure gages, double dial locomotive steam gages, driving wheel crank pin quaterning gages, wheel press recording gages and dead weight gage testers. Represented by H. O. Fetter, C. Gaston and F. J. Gettrust.

B & S Manufacturing Corporation, Hoboken, N. J.—Automatic drifting valve, safety cylinder cock, engine truck cellar and car journal oiling device. Represented by Charles Stern.

Badeker Manufacturing Company, Chicago.—Metallic piston rod packing, hub liner, valve stem packing and automatic shaker box latch. Represented by I. P. McKinley, E. V. Lea and E. C. Cummings.

Baker-Raulang Company, Cleveland, Ohio.—

Locomotive type crane truck, elevating platform truck, three-wheel tractor and drive axle assembly. Represented by B. C. Hooper, W. F. Hebard and V. A. Shoudis.

Baldwin Locomotive Works, The, Philadelphia, Pa.—Literature and photographs. Represented by C. Riddell, W. J. McCarroll, F. A. Neeley, C. H. Gaskill and W. H. Evans.

Barco Manufacturing Company, Chicago.—Power reverse gear, smoke box blower fitting, reservoir joints, engine and tender metallic connections, steam heat metallic car connections, lubricated plug valves, flexible joints for blower and blow-off, yard and station steam heat connection. Represented by C. L. Mellor, A. S. Lewis, F. H. Stiles, W. J. Behlke, Jr., F. B. Nugent, J. L. McLean, M. W. Weston, L. E. Livingston and C. O. Jenista.

Bethlehem Steel Company, Bethlehem, Pa.—Photographs and catalogues. Represented by F. M. Morley, R. S. Folk, J. R. Stuart and I. C. Jordan.

Bird-Archer Company, The, New York.—Power blow-off cock device and water treatment exhibits. Represented by J. L. Callahan, J. J. Clifford, C. A. Bird, H. P. Mauer, J. A. MacFarland, R. A. Wilsey, C. J. McGurn and L. F. Wilson.

Bradford Corporation, New York.—Rocker draft gear, friction draft gear, back head locomotive throttle valve, front end locomotive throttle valve and literature. Represented by E. J. Barnett, A. C. Bodeau, J. C. Keene, E. H. Mattingley, L. F. Rhodes and B. C. Wilkerson.

Buckeye Jack Manufacturing Company, The, Alliance, Ohio.—Heavy duty, general purpose and railroad track lifting jacks. Represented by W. R. Starr.

Byers Company, A. M., Pittsburgh, Pa.—Wrought iron pipe. Represented by J. H. Ainsworth and F. W. Stubbs.

Chicago Pneumatic Tool Company, New York.—Railway speed recorder. Represented by H. R. Deubel, R. C. Bucholz, F. O. Duffy and L. F. Duffy.

Coffin, Jr. Company, The, J. S., Jersey City, N. J.—Feedwater heater system. Represented by J. S. Coffin, Jr., E. L. Schellens and S. H. Winslow.

Consolidated Safety Valve Company, New York.—Safety valves. Represented by C. L. Brown, J. H. Bush, P. H. Ryan, J. S. Smith, J. P. Walsh and C. W. Corning.

Crane Company, Chicago.—Railroad valves, fittings and power plant material. Represented by J. B. Jordan, F. Venton, J. C. Cole and H. Bartlett.

Dearborn Chemical Company, Chicago.—Water treater, water treatment and rust preventive. Represented by R. F. Carr, G. R. Carr, C. M. Hoffman, F. J. Boatright, I. H. Bowen, L. P. Bowen, L. D. Brown, A. W. Cooley, N. F. Dunn, W. H. Kinney, C. R. Murray, J. W. Nutting, O. H. Rehmayer and J. R. Roddy.

Detroit Lubricator Company, Detroit, Mich.—Locomotive force feed oiler, locomotive lubricator, automatic flange oiler, transfer filter and thermostatic control. Represented by A. G. Machnecy, S. A. Witt and W. B. Drake.

Duff Manufacturing Company, The, N. S., Pittsburgh, Pa.—Lifting jacks, governor controller self-lowering jacks, ratchet jacks, journal jacks and push-and-pull jacks. Represented by C. N. Thulin and E. E. Thulin.

Edna Brass Manufacturing Company, The, Cincinnati, Ohio.—Mechanical lubricators, water column, rigid water glasses, gage cocks, air manifold and oil burner. Represented by E. O. Corey, Wm. Beck, F. S. Wilcoxon and H. A. Glenn.

Faessler Manufacturing Company, The, J. Moberly, Mo.—Process for applying side and main rod bushings and brasses. Represented by J. W. Faessler and Austin Reese.

Ford Company, J. B., Wyandotte, Mich.—Cleaning specialties. Represented by C. S. Tompkins and B. N. Goodell.

Franklin Railway Supply Company, New York.—Limited cut-off, precision power reverse gear, booster control valves, flexible joints, radial buffer, unit safety bar, tender booster model and lateral motion driving box. Represented by W. H. Coyle, H. M. Evans, C. W. F. Coffin, J. L. Randolph, T. L. Reed, P. Weiler, P. Willis, S. D. Rosenfelt, W. T. Lane, F. M. Ball, J. A. Tally, T. P. Whelan, E. Caldwell, C. J. Buck.

Galena Signal Oil Company, Franklin, Pa.—Literature. Represented by J. A. McNulty, F. M. Shelton, A. J. Howley, C. C. Craigton, D. L. Eubank and I. C. Brown.

Garlock Packing Company, The, Chicago.—Cab cock packing, ball joint packing, expansion joint packing, power reverse packing and asbestos reverse gear packing. Represented by H. J. Ramshaw and J. F. Franey.

Garratt-Callahan Company, Chicago.—Boiler preservative. Represented by J. G. Barclay, A. H. Baker, W. F. Caspers, H. M. Gray, L. B. Ferguson, A. H. Hawkinson, F. C. Reed and E. W. Miller.

Gilg, Henry F., Pittsburgh, Pa.—Valve, stray-bolt steel turning tools and steel bolts and nuts. Represented by H. F. Gilg.

Gold Car Heating & Lighting Company, Brooklyn, N. Y.—Pressure regulating valves and starting valves for car heating, and steam hose couplers. Represented by W. H. Ivers and A. D. Stuver.

Graham-White Sander Corporation, Roanoke, Va.—Sanders, sand-spreaders and automatic equipment for boosters and electric power. Rep-

resented by James Frantz, W. L. Ransom and W. H. White.

Grip Nut Company, Chicago.—Lock nuts. Represented by W. F. Mitchell and J. M. Scotville, Jr.

Gustin-Bacon Manufacturing Company, Kansas City, Mo.—Adjustable cab seat, throttle rod stuffing box, quadruple unit air-operated whistle for locomotives and brake pipe anchor. Represented by J. W. Foyle, J. S. Hearons, H. E. Anderson, W. E. Davis, G. R. Miller and Fred Speer.

Hancock Inspirator Company, New York.—Inspirators, boiler testers, water columns, hose strainers, boiler checks, globe and angle valves. Represented by C. L. Brown, J. H. Bush, J. H. Ryan, J. S. Smith, J. P. Walsh and C. W. Corning.

Hennessy Lubricator, New York.—Engine truck journal lubricators. Represented by W. L. Gibbs.

Hubbard Steel Foundry Company, E. Chicago, Ind.—Locomotive crosshead, car and locomotive replacers and special high manganese steel. Represented by G. W. Lillie.

Hulson Grate Company, Keokuk, Iowa.—Model of locomotive grate. Represented by A. W. Hulson, J. W. Hulson, J. W. Conrad and P. J. Kavaney.

Hunt-Spiller Manufacturing Corporation, S. Boston, Mass.—Cylinder bushings, cylinder packing rings, sectional packing rings, piston heads, piston bull rings, valve bushings, valve packing rings and crosshead shoes. Represented by J. G. Platt, V. W. Ellet, E. J. Fuller, C. L. Galloway, F. B. Hartman, R. R. Wells, F. W. Lampton and Gordon Leach.

Hyatt Roller Bearing Company, Newark, N. J.—Roller bearings, railroad type and railroad journal box. Represented by C. M. Burdette, C. A. Johnson, T. A. Russell and C. L. Newby.

Imperial Steam Appliance Company, Seattle, Wash.—Automatic flange lubricator, grease plug and drain valve system. Represented by L. G. Spies and Charles George.

Ingersoll-Rand Company, New York.—Photographs and motion pictures of oil-electric locomotives. Represented by E. F. Kultchar, H. G. Erb and W. Hyde.

International Correspondence Schools, Scranton, Pa.—Literature. Represented by E. M. Sawyer, F. S. Powell, J. T. Gill, C. H. Dailey and H. Pottinger.

Jenkins Brothers, New York.—Bronze and iron valves, mechanical rubber goods and gage glasses. Represented by George Royal.

Johns-Manville Corporation, New York.—Rod piston and sheet packings, pipe and boiler insulation, engineers' insulating tape, locomotive front end tape and steam traps. Represented by J. C. Yunglove, P. R. Austin, W. D. Goddard, P. C. Jacobs, D. M. Lewis, F. C. Vandevort, Jr., and L. S. Wilbur.

Joyce-Cridland Company, Dayton, Ohio.—Jacks. Represented by E. A. Hoffman.

Kamstone Holding Corporation, New York.—Air brake indicator. Represented by A. J. Sams.

Leslie Company, Lyndhurst, N. J.—Steam heat regulators, pressure regulators and self-cleaning strainers. Represented by J. J. Cizek.

Lima Locomotive Works, Inc., New York.—Photographs of super steam locomotives. Represented by M. K. Tate, H. W. Snyder and W. H. Winterrowd.

Locomotive Firebox Company, Chicago.—Models of thermic siphons. Represented by G. R. Carr, W. S. Carr, A. A. Taylor, G. N. Deguire, L. R. Pyle, C. M. Rogers, J. Baker, E. J. Reardon and T. F. Klein.

Locomotive Finished Material Company, Atchison, Kans.—Sectional packing rings, section ball rings and floating bushing driving box. Represented by C. Hastings, A. L. McIntosh and E. V. Lea.

Locomotive Stoker Company, Pittsburgh, Pa.—Model of stoker and sheet coal pusher. Represented by W. G. Clark, O. B. Capps, A. L. Whipple, J. J. Byrne, H. C. Woodbridge, E. Prouty, A. N. Wilkie, E. F. Milbank, K. Stoller, O. Detrick, U. P. Emrick, H. Cale, T. L. Capps, G. A. Edwards, C. E. Peterson, T. W. Baldwin, J. B. Ball, H. C. Houston and L. J. Conway.

Locomotive Tire Truing Corporation, Tulsa, Okla.—Tire truing device. Represented by T. J. Talevich, E. E. Shoyt, P. H. Chase and W. L. Gibbs.

Long, Jr. Company, Chas. R., Louisville, Ky.—Paints, lacquers and varnishes. Represented by C. R. Long, Jr., A. G. Hollingshead, W. H. Heckman, C. G. Learned, G. B. Dirth, J. M. Monroe, J. S. Lemley and M. H. Oakes.

Lunkenheimer Company, The, Cincinnati, Ohio.—Valves, oiling devices and other engineering appliances. Represented by H. J. Evans.

MacLean-Fogg Lock Nut Company, Chicago.—Lock nuts. Represented by J. W. Fogg and J. A. MacLean.

Madison-Kipp Corporation, Madison, Wis.—Locomotive force feed lubricator and fluid pressure atomizing check valve. Represented by F. R. Clark and A. H. Flanagan.

Manning, Maxwell & Moore, Inc., Chicago.—Portable tools. Represented by R. S. Dean, E. D. Garfield, A. J. Cote, W. A. Deems and H. J. Duernberger.

Miner, Inc., W. H., Chicago.—Friction draft gears, friction buffers, belster center locking pins side bearings and safety hand brakes. Repre-

Traffic

The New York Central announces that the Twentieth Century Limited, twenty-hour express between New York and Chicago, carried 13 per cent more passengers in August than in August, 1926; and in every month of the past 12 months, the record has exceeded that of the preceding year.

Hearings were begun before Examiner Trezise of the Interstate Commerce Commission on September 20 on the complaint filed by the Baltimore Chamber of Commerce asking the commission to require the railroads to establish increased differentials on export and import traffic transported through Baltimore under the rates on like traffic via New York.

The Norfolk & Western has asked the Corporation Commission of Virginia to discontinue its proceeding looking to the reduction of freight rates in that state; and the Pennsylvania has presented a similar petition, requesting that action be deferred until the completion of the inquiry on rates which is being made by the Interstate Commerce Commission.

The Chesapeake & Hocking, the new 63-mile double-track railroad connecting the Hocking Valley at Valley Crossing, Ohio (near Columbus), with the Chesapeake & Ohio at Gregg, Ohio (near Waverly), was completed and opened for operation on September 15. The C. & O. has up to the present time run freight trains to and from Columbus over the tracks of the Norfolk & Western, between Gregg and Valley Crossing.

The Southern, through its agricultural department (Atlanta, Ga.), has issued a circular announcing the conditions on which farmers in the southern states may compete for the large and beautiful silver cup which is awarded annually by the railroad to the exhibitor of the best ten ears of field corn grown in any one of the eight principal states traversed by the lines of the Southern. The circular gives a list of 18 state fairs at which competitors may enter their exhibits.

The Interstate Commerce Commission has assigned its investigation of western livestock rates, Part 9 of its general rate structure investigation, for hearing on October 17 at Los Angeles, Calif., and October 24 at Fort Worth, Tex. Hearings also will be held as to the southern territory rates on livestock on November 3 at Columbia, S. C.; November 7 at Atlanta, Ga., and November 10 at Louisville, Ky. Testimony on related formal complaint cases involving livestock will be heard at the same times.

The Southern Freight Association, acting on behalf of all the principal railroads in Georgia, except the Seaboard Air Line, has asked the Public Service Commission of that state for authority to issue freight tariffs with rates equivalent to those which have been prescribed by the Interstate

sented by B. S. Johnson, R. Weber, A. E. Biddle, J. F. O'Connor, W. E. Robertson and J. R. Mitchell.

Mudge & Company, Chicago.—Spark arrester and bell ringer. Represented by F. H. DeBrun and A. R. Fletcher.

Nathan Manufacturing Company, New York.—Mechanical and hydrostatic lubricators, lifting and non-lifting injectors, boiler checks and valves, low water alarms, water columns and gage cocks, boiler washers and testers. Represented by W. R. Walsh, F. C. Davern, R. H. Jenkins, J. A. Kelly, C. J. Banning, F. Ehredt, F. Marsh, R. Welsh and T. J. Murphy.

National Malleable & Steel Castings Company, Cleveland, Ohio.—Freight car power hand brake, friction draft gears, couplers and coupler yokes, wrecking and car pulling hooks, journal boxes and repair lids, engine coupler pockets, hose clamps, bevel and wood washers, non-binding ratchets and pawls and steam shovel chain. Represented by G. R. Rasmussen and F. E. Mofett.

National Railway Devices Company, Chicago.—Fire doors. Represented by E. J. Gunnison and Steve Ord.

National Safety Appliance Company, San Francisco, Cal.—Train control appliance. Represented by C. E. Sampson.

National Tube Company, Pittsburgh, Pa.—Seamless pipe and boiler tubes, pipe and pipe coils and pipe bends. Represented by P. J. Conrath and J. Kelly.

New York Air Brake Company, New York.—Pump governor, centrifugal pump strainer and pump piston. Represented by E. F. Wentworth, J. H. Elliot, C. A. Campbell, C. P. Lovell, L. W. Sawyer, G. A. Kliefges, G. A. Allan, O. G. Trieglaff, H. T. Wentworth, F. A. Geister and C. B. Miles.

Norton, Inc., A. O. Moline, Ill.—Self-lowering jacks and journal jacks. Represented by R. J. McKay, E. W. Hanegan and C. H. Smith, Jr. Oakite Products, Inc., New York.—Cleaning materials especially adapted for railroad use, to be used in laundering locomotive air pumps, for stripping paint from tenders, passenger coaches, etc., for back shop tank use, for cleaning freight cars, and for all general cleaning purposes. Represented by D. A. Hearn, C. A. Peterson, A. H. Green and C. J. Copley.

Ohio Injector Company, Chicago.—Lifting type injector, non-lifting type injector, low water alarm, fire jet, boiler tester and washer, boiler check, water glass protector, drifting valve, lubricator and flange oiler. Represented by N. H. Malone, F. B. Farnsworth, C. G. Sauerberg and A. C. Beckwith.

Okadee Company, The, Chicago.—Force feed lubricator, front end hinge, blowoff valves, automatic cylinder cock, tender hose coupler and water glass protector. Represented by A. G. Hollingshead, C. R. Long, Jr., E. W. Ploen, M. H. Oakes, J. S. Lemley, J. M. Monroe, W. H. Heckman, C. G. Learned and G. P. Dirth.

O'Malley-Beare Valve Corporation, Chicago.—Self-grinding valves, gage cocks, blow-off cocks, drop forged washout plugs, and special valves for locomotive service. Represented by B. P. Owens, J. E. Brown, F. E. McCarthy, C. J. Murphy, C. F. Pigott and R. F. Lugg.

Oxweld Railroad Service Company, Chicago.—Welding and cutting equipment and railroad lamps. Represented by W. Jones, A. N. Lucas, W. Leighton, and J. J. Sealens.

Paige & Jones Chemical Company, Inc., New York.—Chemical treatment of boiler water by way side method. Represented by C. B. Flint, R. Falkinburg and H. A. Brinsley.

Paxton-Mitchell Company, The, Omaha, Nebr.—Piston rod, valve stem and air pump packing. Represented by J. L. Paxton, J. J. Keliher, H. J. Molloy and L. J. McConnell.

Pilliod Company, The, New York.—Valve gears. Represented by J. H. Cooper, W. H. Bellmaine, F. Fisher and R. H. Weatherly.

Pilot Packing Company, Inc., Chicago.—Packing. Represented by J. Sinkler, E. R. Rayburn and R. N. Sinkler.

Pyle-National Company, The, Chicago.—Train and locomotive lighting generators, distribution valves, flood lights, headlights and appliances. Represented by J. W. Johnson, W. Miller, J. A. Amos, R. L. Kilker, G. A. Haas, W. Smith, F. Kersten, W. Bretherton, E. Hackensack, W. Ross and T. J. McGinnis.

Railway Equipment & Publication Company, The, New York.—Pocket List of railroad officials. Represented by B. J. Wilson.

Railway Journal, Chicago.—Magazines. Represented by E. C. Cook.

Railway Motors Corporation, De Pere, Wis.—Journal bearing. Represented by W. S. Nordby, R. E. Frame, J. Van Thwager and A. Deverell.

Railway Purchases & Stores, Chicago.—Magazines. Represented by K. F. Sheeran.

Reliance Machine & Stamping Works, Inc., New Orleans, La.—High pressure grease appliances for locomotive rods. Represented by E. B. Norman, H. C. Manchester and G. A. Pettit.

Ridge Tool Company, The, Elyria, Ohio.—Pine wrenches, cutters and vises. Represented by J. E. Lawrence.

Sargent Company, Chicago.—Water columns, gage protectors, rubber gaskets, blower valves, water glass cocks and two-seat gage cocks. Represented by L. L. Schultz.

Sellers & Company, Inc., Wm., Philadelphia, Pa.—Exhaust feed water heater injectors and equipment, top boiler checks, flanged and screw shank boiler checks, feed water strainers, coal

sprinklers and drifting valves. Represented by J. D. McClintock, P. E. Raymond and J. R. New.

Sheafe Engineering Company, Chicago.—Air hose coupling gages, bronze bushed air hose couplings and air hose and coupling testing machine. Represented by Ralph Sheafe.

Simmons-Boardman Publishing Company, New York.—Magazines. Represented by J. M. Rutherford, E. L. Woodward, R. F. Duysters and H. A. Morrison.

S. K. F. Industries, Inc., New York.—Roller bearings. Represented by H. E. Brunner, B. W. Taylor, M. S. McNay and T. E. Rounds.

Snap-On Wrench Company, Chicago.—Socket wrenches. Represented by C. H. Tennyson and J. Johnson.

Standard Oil Company (Indiana), Chicago.—Literature. Represented by G. F. Kemme, E. G. Lowe, B. J. Anderson, R. J. Ronan, C. J. Henry, H. D. Van Valin, E. F. Textmeyer and Mr. Plummer.

Standard Oil Company of Louisiana, New Orleans, La.—Railroad lubricants (oils and greases) and motor oil. Represented by W. H. Booth, H. Bouham and H. C. Ferrell.

Standard Oil Company (N. J.), New York.—Railroad lubricants and motor oil. Represented by W. F. Walsh and R. A. Greene.

Standard Stoker Company, New York.—Stoker model and moving pictures. Represented by F. P. Roesch, C. T. Hanson, L. F. Sweeney, A. E. Patterson, R. Schlacks, E. Schroeder and H. S. Mann.

Sunbeam Electric Manufacturing Company, Evansville, Ind.—Headlights, cross section generator, and four-pole train control generator. Represented by J. H. Schroeder, W. T. Monogue and C. E. Kinnaw.

Superheater Company, The, New York.—Feed water heater and boiler feed pump, exhaust steam injector and locomotive pyrometer. Represented by G. L. Bourne, F. A. Schaff, G. E. Ryder, R. M. Osterman, H. B. Oatley, N. T. McKee, F. R. Fitzpatrick, R. R. Poterfield, C. A. Odell, Bard Brown, C. A. Brandt, E. A. Averill, W. A. Buckbee, K. E. Stillwell, J. E. Mournie, C. M. Wickham, Stett MacDonald, A. McLachlan, B. G. Lynch, G. Dolan, R. J. Van Meter, H. Bell, E. Drewyur, H. V. Jones, W. L. Libby, I. D. Toner, C. R. Fairchild, T. F. Jackson, C. David, W. G. Tawse, H. T. Spicer, G. Fogg, W. B. Grove, C. R. Hardy, J. F. Griffin and B. Smith.

Swanson Company, The, Chicago.—Locomotive gage holders. Represented by O. W. Swanson and R. V. Larson.

Templeton-Kelly & Company, Ltd., Chicago.—Car and locomotive jacks. Represented by J. L. Crowley.

Timken Roller Bearing Company, The, Canton, Ohio.—Roller bearing. Represented by W. E. Albertson.

Transportation Devices Corporation, Indianapolis, Ind.—Mechanical cut-off control, back pressure cut-off indicator, all service power reverse gear and internal bell ringer. Represented by F. H. Lutz and E. S. Pearce.

T-Z Railway Equipment Company, Chicago.—Front end blower nozzle, boiler washout and arch tube plugs, force and sight feed lubricators and locomotive sanders. Represented by G. S. Turner, F. J. Kearney and F. G. Zimmerman.

Union Asbestos & Rubber Company, Chicago.—Railroad packings and asbestos materials. Represented by W. R. Gillies and G. J. Martin.

Union Draft Gear Company, Chicago.—Friction draft gear. J. A. King, L. T. Canfield, C. J. Gorman, F. E. Schmitz, D. Sprout and C. A. Danielson.

Universal Packing & Service Company, Chicago.—Spring journal box packing. Represented by J. P. Landreth, W. H. Davis, W. M. Gibbs and R. C. Blaklee.

Vapor Car Heating Company, Chicago.—Locomotive steam heat stop valves, reducing valves, flexible metallic steam conduits and yard joints, steam hose couplers and end train pipe valves. Represented by J. E. Boker, N. F. Burns, L. B. Rhodes, E. E. Smith, L. H. Gillick and E. C. Post.

Viloco Railway Equipment Company, Chicago.—Sanders, uncoupling lever attachment, pneumatic whistle operator, piston rod and valve stem packing, automatic rail washer, vacuum type bell ringer, lubricator for piston rods and valve stems. Represented by C. R. Long, Jr., A. G. Hollingshead, G. P. Dirth, J. M. Monroe, C. G. Learned, M. H. Oakes, J. S. Lemley, W. H. Heckman and C. W. Ploen.

Walworth Company, Boston, Mass.—Railroad valves and fittings. Represented by J. A. Ellis, W. J. Moran and E. S. Rawson, Jr.

Westinghouse Air Brake Company, Wilmerding, Pa.—Draft gear, packings and gaskets, feed valve, hose coupling gages, retaining valve, angle cock, diaphragm type cut-out cock, dirt collector and centrifugal air cleaner. Represented by J. B. Wright, C. J. Olmstead, C. D. Foltz, J. R. Holtom, L. M. Carlton, E. A. Maylock, R. P. Ives, T. G. Myles, H. L. Fuller, W. M. Slett, A. G. Houston, F. B. Johnson, F. H. Parke, A. L. Berghane, A. J. Layton, I. Simpson, J. S. Y. Fralich and E. H. Weaver.

Worthington Pump & Machinery Corporation, New York.—Locomotive feedwater heater. Represented by D. R. Coleman, T. C. McBride, J. E. Buckingham, F. F. Murray, J. M. Lammedee, J. F. Cosgrove, J. E. Barber, C. I. Williams, J. E. Cameron, J. P. Collins, W. Christianson, R. E. Wilson, T. E. MacGowan, E. C. Jackson, F. Merrill and G. Bourne.

Commerce Commission for interstate freight in that region. The Seaboard Air Line makes a similar request, but asks for higher rates on shipments which pass over two or more railroads. The interstate rates referred to are the same for joint carriage as for shipments over a single line.

The Interstate Commerce Commission has postponed the dates for some of its hearings in connection with its investigation of rates on cotton, as part of its general rate structure investigation, to avoid conflict with the convention of the National Association of Railway & Utilities Commissioners. The hearing set for October 13 at Atlanta has been postponed to October 26, and that set for October 31 at Los Angeles to a date to be announced later. No change is made in the assignments for Gulfport, Miss., following the Atlanta hearing, and Oklahoma City and Dallas, November 18 and 25.

The Southern Pacific has placed its "Cascade," between San Francisco, Cal., and Portland, Ore., on a 23-hour schedule. The train now leaves San Francisco at 4:40 p.m., as previously, and arrives in Portland at 3:40 p. m. the next day, instead of 4:05 p.m. Returning, it leaves Portland at 10 a.m., instead of 10:05 a.m., and arrives in San Francisco at 9 p.m., instead of 9:25 p.m. The train, southbound, makes direct connections at Oakland with the Padre, which will arrive in Los Angeles, Cal., at 9:45 a.m. the second morning. The "Shasta" also has had its time shortened. Returning, it leaves Portland at 8:30 a.m., as heretofore, but arrives in San Francisco at 11:30 a.m., instead of 11:50 a.m.

A display of the chemical and mineral resources of the southern states, made by the Southern at the Exposition of Chemical Industries in the Grand Central Palace, New York City, beginning September 26, is said to be the most comprehensive display of the mineral resources of the South that has ever been made. It includes specimens of minerals only from deposits which are favorable for development and within reasonable reach of transportation facilities. The Southern Pacific, in an elaborate display under the direction of G. J. Sielaff, chief geologist of the company, exhibits a great variety of minerals, both common and rare, taken from undeveloped deposits in the Pacific coast states and from other regions along the company's lines.

Gas Pipe Shipped from Milwaukee to Texas

A total of 222 carloads of 22-in. steel gas line pipe were shipped by the A. O. Smith Corporation, Milwaukee, Wis., on September 15 to the Dixie Pipe Line Company, to be used in the construction of a pipe line from the Shreveport area in Texas to Houston, Texas, and Port Arthur. The six trains of 37 cars each were moved over the Chicago, Milwaukee & St. Paul to Kansas City, Mo., where the cars were distributed among several roads for movement to points in Texas. The ship-

ment weighs 5,625 tons. Other shipments will follow until the order, which embraces approximately 1,800 carloads, is filled.

Ohio Valley Shippers' Board

Commodity committee reports, presented at the fifteenth session of the Ohio Valley Shippers' Advisory Board, indicate that the coming three months will see normal business in virtually all products in the Ohio valley region. An increase is expected in shipments of some products and a decrease in only one—lumber. The outlook for agricultural crops as a whole is favorable. An increase is expected in the shipments of cement, fertilizer, paper products and building materials. Lumber shipments are expected to decrease 10 per cent as compared with the same period last year.

Pennsylvania Publishes Fast Freight Schedules

The Pennsylvania is issuing in pamphlet form a full compilation of its scheduled freight train service between leading cities; 60 trains with names, and innumerable other trains designated only by numbers and letters. The schedules given show the time of arrival at the various destinations, such as "next noon," "next morning," "second morning," "third morning," etc., following delivery of the freight to the company. The symbols by which the various trains are known are given in each case. In addition, the classification of freight accepted for each train, such as "merchandise," "livestock," "perishable," etc., is indicated.

Interpretation of Hoch-Smith Resolution Challenged

A court test of the constitutionality of the Hoch-Smith resolution, as interpreted by the Interstate Commerce Commission in its recent decision ordering reductions in rates on deciduous fruits from California, is proposed by the defendant railroads unless the commission grants their request for a reconsideration, according to a petition which they have filed asking a postponement for at least 60 days from October 10 of the effective date of the order.

Petitioners state they are fully convinced that the commission's decision in this case, which reversed an earlier one that the rates were not unreasonable, is against the evidence and contrary to the law. If enforced, they say, it will deprive the carriers of their property without due process of law, and they believe that it is in the interest of all, including the commission, the shippers and receivers of deciduous fruit and of all other commodities directly or indirectly involved, that in the event their petition for reconsideration, filed concurrently, be denied, there be an authoritative determination of the constitutionality of the resolution as interpreted.

In the event the petition is not granted and the order postponed, the petition says, the railroads intend filing a bill in equity to enjoin enforcement and to obtain from a court of competent jurisdiction an authoritative determination of the issues involved.

It is asserted that the decision fixes rates

so low as to be confiscatory; that the resolution did not authorize the making of rates on any basis other than that which was authorized by law prior to its adoption.

The commission's order required a reduction of a \$1.73 rate from California to Groups A to M to \$1.60 and a \$1.62 rate to Group J to \$1.50, finding that the reduced rates would be the "lowest possible lawful rates compatible with the maintenance of an adequate transportation service and necessary to promote the freedom of movement of specified products of agriculture."

The commission, on September 20, announced a granting of the petition to the extent of postponing the effective date of the order to November 10, but said nothing about a reconsideration of the case.

Northwest Grain Shipments Exceed Those of Last Year

Despite the fact that the movement of northwestern grain to markets is far heavier than that of a year ago and that receipts at Minneapolis and Duluth on some days have been more than double those of corresponding days of 1926, the movement is being handled at the terminal markets without difficulty, according to reports made at a meeting of the Northwest Shippers' Advisory Board at Minneapolis, Minn., on September 15. The supply of grain cars on northwest roads, which at the start of the 1927 crop movement was the best in history, continues to be ample for the present and probable future requirements. Nothing approaching a blockade has developed at either Minneapolis or Duluth, or any serious congestion at the seven outside sampling points maintained by the railroads.

The only indication of a tie-up in the grain movement has occurred at Grand Forks, where the eastbound rush of wheat has caused approximately 200 cars to be held up awaiting sale. At the board meeting, preliminary steps were taken for effective co-operation between grain and elevator companies, mills and railroads serving Grand Forks, to keep the grain moving.

Tipping Complained of as Unlawful

The Interstate Commerce Commission on September 17 made public the petition filed with it by the Brotherhood of Sleeping Car Porters, asking the commission to investigate the practice of tipping, which it asserts has been "encouraged, developed and officially confirmed" by the Pullman Company. The petition has been docketed by the commission as a formal complaint. Specifically it asks:

"That defendant be required to cease and desist from, directly or indirectly, informing and instructing applicants for positions as porters that they may expect increment to their wages from passengers, and from inducing or permitting porters in its service to receive gratuities from passengers, and from continuing to fix its wage rates for porters at an amount insufficient to enable them to remain in the service, and from all acts, policies or practices tending to produce discriminations

among passengers in the service rendered them by its employees, and from inducing payment by passengers for services rendered in excess of the prices printed on the tickets of passengers." Allegations are made that the "practice" causes violations of sections 1, 2 and 3, as well as other sections of the interstate commerce act. There is no suggestion that the commission penalize a porter who accepts a tip.

Changes in Orange Prices Not Due to Freight Rates

New York, Boston, Chicago and Philadelphia consume approximately 55 per cent of the oranges shipped from Florida and California, according to a study just completed by the Bureau of Railway Economics as to production and distribution of oranges and the effect of freight rates on prices. Of the 42,290 carloads of oranges unloaded for the year ended with September, 1926, at 36 principal markets, those four cities received 23,016 carloads or 54.5 per cent. Of that number, 8,734 cars came from Florida and 12,928 came from California. This amounted to 61.5 per cent and 48.6 per cent of the aggregate number of cars of Florida and California oranges, respectively, unloaded in the 36 markets. New York City alone accounted for 32.6 per cent of the total from Florida in the 36 markets and 24.1 per cent of the California unloads. In the 1925-1926 season, oranges from Florida, California and Porto Rico brought higher average wholesale prices at New York than at any of the other markets. The seasonal spread in the wholesale price of Florida oranges was nearly eleven times the highest freight rate to New York, Boston, Philadelphia or Chicago, while the seasonal spread on California oranges was over fourteen times the highest freight rate to any of those markets. Since freight rates on oranges remained stable, the causes for these violent price changes must be sought among other economic factors of distribution.

Freight Traffic in July

Freight handled by Class I railroads in July amounted to 38,382,108,000 net ton-miles, according to a compilation by the Bureau of Railway Economics. This was a decrease of 3,335,143,000, or eight per cent under that of July, 1926. When freight traffic was the greatest for any July on record. All districts reported decreases, the Eastern district 8.5 per cent., the Southern 5.3 per cent and the Western 8.3 per cent.

For the first seven months of 1927, the volume of freight was the greatest for any corresponding period ever reported, amounting to 272,374,299,000 net ton-miles, an increase of 1.3 per cent above that of the corresponding period last year, which had previously marked the high record. Railroads in the Eastern district for the seven months now reported carried an increase of 1.7 per cent, while the Southern district reported a decrease of 1.5 per cent. The Western district reported an increase of 1.9 per cent.

The average daily movement of freight cars for the first seven months of 1927

was 29.8 miles per car, an increase of $\frac{1}{2}$ mile above the best previous average for such a period, established in the first seven months of 1926. The average in July was 29.1 miles, compared with 30.5 miles in July last year.

The average load per car for the seven months was 27.3 tons, an increase of three-tenths of one ton above the average for the first seven months of 1926. For July the average this year was 27 tons, compared with 27.6 tons in July last year.

Fair Alberta-Ontario Coal Rate Placed at \$12.20

For a number of years the province of Alberta, through its members in the Parliament at Ottawa, has conducted a campaign to get low rates on the railways, chiefly the Canadian National, whereby that province could market its coal in Ontario, and the government of the latter province has co-operated in the campaign to encourage use of Canadian coal. Many experimental shipments have been made, but with results discouraging to both provinces, as the cost of the coal to the Ontario consumer could not be made sufficiently low to compete with the coal from Pennsylvania.

At the last session of the Canadian Parliament the Alberta group succeeded in getting the government to instruct the Dominion Railway Board to make a careful study in transportation costs and report on the minimum for which the coal could be hauled to Ontario. Last week, in a majority report of the Board, signed by Chief Commissioner H. A. McKeown and Assistant Chief Commissioner S. J. McLean, the government was informed that the out-of-pocket cost of moving Alberta coal to Ontario would be \$7.22 per ton. The inclusive cost of transportation, including overhead and superintendence, would be \$10.07, and the inclusive cost, "plus the element of profit," would be \$12.20 per ton.

Commissioner Oliver finds that the out-of-pocket cost of transportation may be said to be \$6.50 per ton. The commissioner's finding of \$6.50 a ton is a blanket rate designed to cover all Ontario points and points in Quebec within 100 rail-miles from Ottawa, and points on the National Transcontinental and branches in Northern Quebec eastward to and including La Tuque. A rate of \$6.75 is recommended for those parts of Quebec not covered by the \$6.50 blanket rate, the \$6.75 rate to extend as far eastward as and including Levis and Diamond Junction. With respect to the inclusive cost and the inclusive cost plus profit, Commissioner Oliver declares himself unable to draw definite conclusions from the evidence submitted.

Publication of the report was made by the Minister of Railways. Questioned in respect to the intentions of the government regarding the findings, he stated that the government was only just in receipt of the report and had had as yet no time to give the matter consideration.

The report is not in the nature of a judgment. It states that after full consideration and study of the evidence and exhibits placed before the board, figures were arrived at which furnish the best answer the board can give to the various

phases of the inquiry submitted by order-in-council on February 13, 1926.

This reference to the board was made by the government following dissatisfaction over the tariff rate of \$12.70 per ton on Alberta coal to Ontario points and the limited application of the subsequent \$9 and \$7 rates temporarily established by the Canadian National to test out the Ontario market, and with a view to stimulating the development of the coal resources of Canada. The board was instructed to inquire into and report upon the cost of transportation of coal per ton in full capacity train-load quantities during the period of the year when the rolling stock of the railways was not mobilized for the transportation of the grain crop of western Canada.

Says Maritime Rates Decision Is Burden on Canada's Treasury

Dissenting from his colleagues on the Dominion Railway Board who early last week refused the application of the Canadian National for rescission of the previous order to keep open the St. John, N. B., and Ste. Rosalie Junction, Que., gateways, Commissioner Frank Oliver later in the week issued a judgment in which he declared that the order complained of by the Canadian National, which would compel that road to publish joint rates with the Canadian Pacific on freight originated by the former in the Maritime Provinces and bound for points west, was "a weapon by which the Canadian National may be injured" and that it would add to the burden imposed upon the federal treasury by the Maritime Freight Rates Act.

It will be recalled that at the last session of the Canadian Parliament the Maritime Freight Rates Act was passed, providing for a 20 per cent reduction in rates on freight originating in the Maritime provinces and bound west to other parts of Canada, the federal treasury to reimburse the railroads for any loss of revenue sustained by the operation of that legislation.

Commissioner Oliver contends that the original order to the railways to file joint tariffs westward through St. John and Ste. Rosalie continued and confirmed "a traffic condition contrary to the generally accepted principle that the railroad upon which traffic originates is entitled to the long haul earnings on that traffic, and that the order of July 14 last (a repetition of the former order) imposed conditions which are 'inherently and seriously detrimental to earnings of the Canadian National Railways.'"

It is also contended by Commissioner Oliver that the Maritime Freight Rates Act, passed at the last session of Parliament, "has created a new traffic condition under which the burden of losses on operation of the Canadian National Railways in the Maritime provinces is placed directly upon the national treasury, and therefore it becomes more necessary than before that the system as a whole shall be permitted to earn the maximum of which it is capable, and to that extent lighten the added burden imposed on the Dominion treasury by the Maritime Freight Rates Act." He also declares that there would be no substantial advantage accruing to the Maritime people by observance of the order.

Foreign

Australian Tie-up Ends

By a decision reached at a conference between representatives of the Railway-men's Union of Australia and Premier McCormack of Queensland the strike of employees on the state railways was scheduled to end on September 10.

Iceland to Have a Railway

Iceland, one of the few countries in the world without railway service, is to have this deficiency remedied according to advice from Vice-Consul Mackie at Copenhagen. The Norwegian Company, Titan, Ltd., has the contract. The line will run from Reykjavik, the capital, to Thojorsaa, 50 miles, and will cost about \$500,000.

Construction is to be begun on the railway before May 1, 1929, and is to be completed not later than July 1, 1933. If the company fails to meet these terms, all the work executed falls to the state, without any compensation to the company.

Japanese Railways Returns

The financial results of operation of the government railways of Japan for the year ending March 31, 1926, showed a surplus of \$110,691,495, an increase over the previous year, when the surplus amounted to \$102,349,294. The net in 1926, after deducting from the surplus of revenue over operating expenses, the subsidies to private railways, interest charges and additional operating expenses, \$71,629,343.

In 1926 the total mileage operated by the government railways showed an increase of 276.8 miles over the preceding year, an increase in the average mileage operated of 257.7 miles. The number of passengers carried increased 6.5 per cent in 1926 over 1925, and freight tonnage carried increased 2.7 per cent. A number of improvements in service were made in 1926, among which were the addition of new sleeping cars, special express service, and reductions in rates for teachers and students. Because at the beginning of the

fiscal year there was a slump in passenger traffic, believed to be due to a general decline in business, several measures were adopted to increase passenger traffic. Special train service was arranged to points of interest, such as noted shrines, temples and sport centers, where large throngs of people were expected to visit and special low rates for parties of passengers were given to these points.

To facilitate and increase movement of freight, rates in effect were revised during the year. Rates for shipment of freight between the main island and Hokkaido were reduced due to the establishment of a through service on this freight, thereby eliminating extra charges for reloading. New equipment added during 1926 included 157 new locomotives, consisting of 49 6-wheel type for passenger service, 95 8-wheel type for freight service, five 8- to 12-wheel type, and eight 8-wheel electric locomotives for use in freight service. A number of freight cars, or goods wagons, were added to the service to handle increases in shipments of several classes of freight, particularly livestock and coal.

Miscellaneous

The following reports have been received by the Department of Commerce from its agents in various parts of the world:

An order for refrigerator cars is being negotiated between Soviet Russian agents and the representatives of two Latvian companies (Phoenix and the Libau Harbor Workshop). It is rumored that the order calls for the construction of 2,500 refrigerator cars to be built in five years, 500 cars to be delivered every year.

In a recent call for bids for freight cars, petroleum tank cars and especially designed box cars for explosives, for use on the Arica-La Paz Railway, the Ministry of Public Works of Chile stated that only domestic manufacturers may submit bids. While freight and box cars can be made in Chile, the petroleum cars have never before been attempted. There was also a call for quotations on Mikado type locomotives, preferably by local manufacturers. No attempt has ever before been made in Chile to produce a locomotive and the cost to the government would be much higher than if they were purchased abroad.

Supply Trade

Malcolm S. Simpson, Louisville, Ky., has been appointed direct sales representative for the **Morton Manufacturing Company**, railroad division, in the territory surrounding Louisville.

The **Manganese Steel Forge Company**, Philadelphia, Pa., has opened an office at 1335 Old Colony building, Chicago. W. H. Potter, formerly of the Philadelphia office, is in charge.

The **New England Wood Preserving Company** with offices in Boston, Mass., and timber treating plant at Nashua, N. H., has been appointed eastern sales agent for the new wood preserving plant of **J. F. Prettyman & Sons**, Charleston, S. C. The sales in New York, New Jersey and eastern Pennsylvania will be handled from an office recently opened at 350 Madison avenue, New York City.

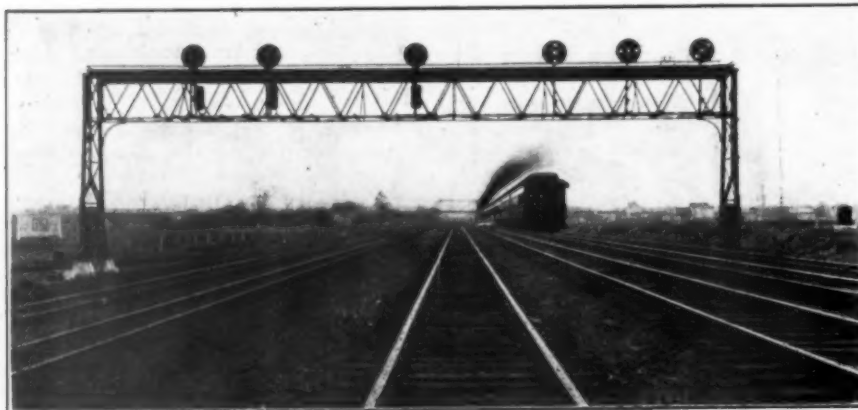
Obituary

Frank C. Wight, editor of the *Engineering News-Record*, died suddenly on September 18 at his home in Summit, N. J., in his forty-sixth year. Mr. Wight was born in Washington, D. C., and attended Columbian (now George Washington) University in that city from 1899 to 1901, and was graduated from Cornell University in 1904. He was employed in the District of Colum-



F. C. Wight

bia's surveyor's office prior to his graduation and, following it, served as assistant to the engineer of bridges of the District of Columbia until 1907, when he joined the staff of the *Engineering News-Record* as associate editor. In 1912 he became managing editor, and continued as such with the enlarged publication, the *Engineering News-Record*, from 1917 until 1924, during which later year he was appointed editor. Mr. Wight was president of the National Conference of Business Paper Editors and was actively identified with association committee and conference work on various engineering problems.



Where Are the Telegraph Poles?

Pennsylvania Railroad near Elizabeth, New Jersey. The wires are all underground.

Equipment and Supplies

Locomotives

THE WALTER A. WOODARD LUMBER COMPANY, Cottage Grove, Ore., has ordered one Prairie type locomotive from the American Locomotive Company.

THE MUKDEN-HAILUNG (China) has ordered through Mitsui & Co., New York, 2 Mikado type locomotives from the American Locomotive Company. An order for 4 Mikado type locomotives has been let to the Baldwin Locomotive Works.

Freight Cars

THE CUDAHY PACKING COMPANY, Chicago, is now inquiring for 200 refrigerator cars.

THE PERE MARQUETTE is inquiring for from 500 to 1,000 box cars of 40 tons' capacity.

THE CARNEGIE STEEL COMPANY has ordered 40 tank cars from the American Car & Foundry Company.

Passenger Cars

THE SOUTHERN is inquiring for one business car and also for one business dining car.

THE CHICAGO GREAT WESTERN is inquiring for 4 combination baggage and mail cars.

THE RICHMOND, FREDERICKSBURG AND POTOMAC is inquiring for one gas-electric rail motor car.

THE BOLIVIAN GOVERNMENT RAILWAYS are inquiring through the car builders for three steel underframe sleeping cars, 50 feet long.

THE SOUTHERN PACIFIC has ordered 6 combination baggage and mail cars from the Pullman Car & Manufacturing Corporation. Inquiry for this equipment was reported in *Railway Age*, issue of August 13.

THE GREAT NORTHERN has ordered one combination passenger, baggage and mail, gas-electric rail motor car, from the J. G. Brill Company. Inquiry for this equipment was reported in the *Railway Age* of August 6.

Iron and Steel

THE LEHIGH VALLEY is inquiring for 375 tons of steel for a bridge at Newark, N. J.

THE NEW YORK CENTRAL is inquiring for 100 tons of steel for a bridge at Syracuse, N. Y.

THE BALTIMORE & OHIO is inquiring for 750 tons of steel for various bridges at Middletown, Ohio.

THE GEORGIA & FLORIDA has ordered 900 tons of steel for a bridge in South Carolina, from the Virginia Bridge & Iron Company.

THE SOUTHERN PACIFIC has ordered 185 tons of structural steel for a warehouse in San Francisco from the Judson Manufacturing Company.

THE READING has ordered 300 tons of steel for a bridge near Philadelphia from the American Bridge Company and has ordered 150 tons of steel for a bridge near Glenside, Pa., from the Bethlehem Steel Company.

THE LOUISVILLE & NASHVILLE has ordered 61,600 tons of 100-lb., 39-ft. length rails from the Tennessee Coal, Iron & Railroad Company. Deliveries are to be made between October, 1927, and March, 1928, and in about equal monthly quantities.

Machinery and Tools

THE ERIE is inquiring for one 22-ton standard locomotive crane.

THE ATCHISON, TOPEKA & SANTA FE has ordered a No. 7½ rod borer from the Niles-Bement-Pond Co.

THE SOUTHERN PACIFIC has ordered a 96-in., 600 ton wheel press from the Niles-Bement-Pond Co.

THE GRIFFIN WHEEL CO. has ordered a 48-in., 300 ton wheel press from the Niles-Bement-Pond Co.

Signaling

THE CHICAGO, ROCK ISLAND & PACIFIC has ordered from the Union Switch & Signal Company material for an electric interlocking, to be installed at Root street, Chicago; 35 levers.

THE NEW YORK CENTRAL has ordered from the General Railway Signal Company eight intermittent inductive automatic locomotive equipments for use on engines which run over the Susquehanna division of the Erie.

Highway Crossing Signals in Syracuse

In Syracuse, N. Y., where the double-track main passenger line of the New York Central runs for a distance of about one mile through the center of Washington street, and the speed limit for all trains is 15 miles an hour, the company proposes, as an additional safety measure, to install horizontal flashing light signals at the nine transverse streets which have to be crossed, a signal at each crossing, on each side of the railroad; estimated cost, \$29,000. The signals are to be operated by attendants, who will be housed in towers supported on bridges spanning the tracks, one man for each three crossings.

Construction

CANADIAN NATIONAL.—This company will receive tenders until September 26 for the clearing of the site, grading and installation of culverts on a proposed storage yard to be constructed east of Current River, near Port Arthur, Ont.

CANADIAN NATIONAL.—Tenders were received up to September 19 for the clearing of right-of-way, grading and installation of culverts on a line 18 miles in length with which it is proposed to connect Kindersley, Sask., on the Alsask-Saskatoon line, and Glidden, Sask., on the Eyre-Tichfield line. Tenders will be received until September 26 for the construction of 15 section foremen's dwellings at various points on the Alberta, Manitoba and Saskatchewan districts, 12 tool houses at various points on the Manitoba and Saskatchewan districts and one third-class and one fourth-class station on the Alberta district.

CHICAGO, MILWAUKEE & ST. PAUL.—The federal court at Chicago has authorized the expenditure of \$333,700 for the extension of the dock and warehouse and accompanying facilities at Seattle, Wash. These improvements will accommodate the interchange of freight between the Milwaukee and Osaka-Shosen-Kaisha, which has transferred the terminus of a number of its steamship lines between the Orient and Puget Sound from Tacoma, Wash., to Seattle. Included in the improvements are: extension of wharf, \$65,200; extension of warehouse, \$29,300; automatic sprinkler system, \$40,000; office, waiting room and club for steamship employees, \$24,000; oil facilities, pipe lines, tanks, retaining wall and spur track, \$80,000. To provide for these additional facilities added real estate was purchased at a cost of \$85,000. The court has also authorized the construction of water-treating plants at the following points, with expenditures as indicated: Sturtevant, Wis., \$18,000; Roundup, Mont., \$16,000; Rondout, Ill., \$15,800; Bonilla, S. D., \$24,100, and Shawmut, Mont., \$9,800. The plant at Rondout will have a capacity of 17,000 gal. per hour, while that at Bonilla will have a capacity of 7,000 gal. per hour.

DELAWARE, LACKAWANNA & WESTERN.—This company has postponed the awarding of bids for the erection of a railroad Y. M. C. A. building at Elmira, N. Y., reported in the *Railway Age* of August 6, 1927, until next spring.

ERIE.—This road has awarded a contract for work on the elimination of grade crossings at Glen Rock, N. J., to Parker & Graham of Paterson, N. J. It also plans the elimination of a grade crossing at Franklin, N. J., which involves the construction of a viaduct across the lines of the Delaware, Lackawanna & Western and the Lehigh & Hudson.

GREAT NORTHERN.—Plans have been prepared for the construction of a viaduct over the tracks of this company and the Chicago, Milwaukee & St. Paul at Chest-

nut and Bay streets, Bellingham, Wash. The cost of the structure, which is estimated at \$100,000, will be borne jointly by the two railroads involved and city of Bellingham.

LAKE ERIE & FT. WAYNE.—The Interstate Commerce Commission has granted this road authority to construct an extension of its line in Allen county, Ind., from its present southwesterly terminus, in a southwesterly direction, a distance of a little more than one mile, to the connection with the tracks of the Wabash. Cost of construction will be about \$25,000, and the Interstate Commerce Commission granted authority to issue \$26,250 of capital stock, consisting of 1,050 shares, par \$25, to cover cost of construction.

MISSOURI PACIFIC.—A contract for the construction of a three-story reinforced concrete combination boiler, tank and blacksmith shop building with outside dimensions of 133 ft. by 144 ft. at Ewing avenue, St. Louis, Mo., has been awarded to the Gillespie and Daly Construction Company, St. Louis. The cost of the building is estimated at \$90,000.

PENNSYLVANIA.—This road plans the elimination of grade crossings at South Harrisburg, Pa., and it also plans widening the Market street subway at Harrisburg.

PENNSYLVANIA.—The New York State Public Service Commission, on September 16, issued an order for the elimination of four grade crossings in East Aurora, Erie county. The plans for this work provide for raising the grade of the railroad for a long distance, and the estimated cost of the work is \$678,490.

PENNSYLVANIA.—A contract has been let to the McClintic-Marshall Steel Supply Company of Pittsburgh, Pa., for the construction of a new canopy on the north side of the train shed of the Union Station at Pittsburgh. A contract has also been awarded to the Colianni & Dire Company, of Chicago, Ill., for the grading and track work in connection with the elimination of a grade crossing at 47th street in Chicago. James F. Brogan & Co., of Philadelphia, Pa., have been awarded a contract for the grading and track laying of additional yard tracks at the American Railway Express Terminal at Long Island City, N. Y., which will cost \$25,000. The Seaboard Construction Company, Philadelphia, has been let a contract for the erection of structural steel work on the Wabash River bridge at Terre Haute, Ind., at a cost of \$45,000. A contract has been awarded to the Dravo Contracting Company, Pittsburgh, for the construction of a concrete slab deck for the new Wabash River bridge and for the removal of the old bridge at Terre Haute at a cost of \$60,000.

ST. LOUIS-SAN FRANCISCO.—Bids were received until September 22 for the construction of a one-story brick combined passenger and freight station at Columbus, Miss. The outside dimensions of the building will be 35 ft. by 226 ft. The project will include a brick and reinforced concrete platform 226 ft. long. Bids closed on the same date for the construction of a similar station at Demopolis, Ala.

Financial

BALTIMORE & OHIO.—Bonds Authorized.—The Interstate Commerce Commission has granted this company authority to issue \$529,000 of its 6 per cent Toledo-Cincinnati division first lien and refunding mortgage series C bonds. Authority has also been granted to various subsidiaries of the Baltimore & Ohio to issue various bonds totaling \$7,395,500 and deliver them upon the order of the Baltimore & Ohio. The bonds are to be pledged with the trustee of the Baltimore & Ohio's general and refunding mortgage, but the carrier will not be entitled to draw down bonds under that mortgage since it has already issued stock against the capital expenditures involved.

CAPE GIRARDEAU NORTHERN.—Foreclosure Sale.—Three sections of this road were sold at public auction at Cape Girardeau, Mo., on September 12. C. A. Vandivort & Co., a holding concern acting for the Cape Girardeau Terminal Association, purchased the two sections between Ancell, Mo., and Cape Girardeau, and from Cape Girardeau to a point 8 miles west. The 35-mile section from Saline Junction, Mo., to Farmington was purchased by J. P. Cayce, of Farmington. No bids were received on the three remaining sections of the road. The sale awaits approval by the common pleas court in Cape Girardeau.

The Cape Girardeau Northern has been in receivership since April 14, 1914.

CISCO & NORTHEASTERN.—Notes Authorized.—The Interstate Commerce Commission has authorized this company to issue \$1,273,230 6 per cent promissory notes, to be delivered to the Texas & Pacific, which owns a majority of the company's stock, for advances in connection with the construction of a 35-mile extension of the line from Breckenridge, Tex., to Throckmorton.

DENVER & RIO GRANDE WESTERN.—No General Mortgage Bond Interest Declared.—Directors, at their meeting on September 19, failed to declare any interest payment on the general mortgage 5 per cent bonds, the interest on which bonds is to be paid, if earned, at the discretion of the directors.

ERIE.—Tentative Valuation.—The Interstate Commerce Commission, in its tentative valuation report covering the property of this company and 37 subsidiaries as of 1918, finds the final value for rate-making purposes to be \$282,390,001 for the carrier property used, including \$111,717,401 for leased lines. The value of the property owned is placed at \$172,026,148 and that of the property both owned and used at \$170,672,600. The Erie had outstanding on valuation date a capitalization of \$391,702,584, and its book investment in road and equipment was \$283,005,647. With readjustments required by the accounting examination, the report says, this would be reduced to \$277,447,329. The cost of reproduction new of the used property, exclusive of land, was placed at \$273,797,604,

and the cost of reproduction less depreciation at \$206,305,623. The 27,612 acres of carrier lands used are assigned a "present value" as of valuation date of \$56,831,287. The company owned \$130,517,469 par value of securities of and other investments in other companies, carried in its accounts at \$153,211,148 book value. The sum of \$11,172,600 is included in the final value as owned and used on account of working capital.

KANSAS CITY SOUTHERN.—Objections to Merger.—A brief has been filed with the Interstate Commerce Commission by a group headed by R. C. Duff, president of the Waco, Beaumont, Trinity & Sabine, protesting further against the plans of L. F. Loree to merge the Kansas City Southern, Missouri-Kansas-Texas and St. Louis-Southwestern. The commission is asked to institute proceedings to compel the Kansas City Southern to divest itself of its Katy and Cotton Belt holdings.

LACKAWANNA SECURITIES COMPANY.—Distribution.—Directors have declared a distribution of \$3 a share, payable October 1 to stock of record September 20. The payment is termed a distribution because a part of it is in liquidation of assets, consisting of Glen Alden bonds, the outstanding amount of which is reduced at the rate of \$1,500,000 annually.

MOBILE & OHIO.—Bonds Sold.—J. P. Morgan & Co., the First National Bank and the National City Company have sold \$13,879,000 4½ per cent refunding and improvement mortgage bonds, series of 1977. The proceeds of the issue will be used to pay at maturity on December 1, 1927, \$7,000,000 first mortgage 6 per cent bonds and \$2,500,000 St. Louis division mortgage 5 per cent bonds, and to retire \$379,000 general mortgage bonds due September 1, 1938, and bank indebtedness of \$1,000,000 incurred in retiring that amount of first extension mortgage 6 per cent bonds which matured July 1, 1927. The balance of the proceeds will be used to reimburse the company's treasury in part for expenditures made prior to July 1, 1927, for additions and betterments to the company's property.

NEW YORK CENTRAL.—Further Hearing on Relation of Short Lines to Merger Proposal Asked.—The New York Central and the Cleveland, Cincinnati, Chicago & St. Louis have filed with the Interstate Commerce Commission, in the name of P. E. Crowley, president, a petition for further hearing on the applications for authority to lease the Michigan Central, Big Four and other lines already controlled by the New York Central, for the purpose of offering further testimony concerning the financial, traffic, operating or other conditions affecting short lines connecting with the lines involved in the proposed leases. In the proposed report of the commission's examiner a recommendation was made that the applications be denied on the ground that provision had not been made for the inclusion of short lines. The petition says that such testimony was not believed to be germane, but that it is now desired to offer it because the examiner found that failure to offer such testimony amounted to a sub-

stantial defect in the presentation on behalf of the applicants.

NEW YORK, NEW HAVEN & HARTFORD.—New Arrangement With Bankers.—E. J. Pearson, president, has advised stockholders and holders of the company's 6 per cent convertible debenture bonds that a new agreement had been made with J. P. Morgan & Co. relative to the underwriting of the new issue of preferred stock. President Pearson's statement said:

"The company is now in a position to proceed with its proposed issue of 7 per cent preferred stock which was voted by the stockholders on August 17 last. The Interstate Commerce Commission in its decision and order, dated September 9, 1927, has authorized this issue, and its validity has been approved by counsel.

"The commission did not approve the underwriting agreement which you authorized, and which was recommended by the board of directors to insure the success of the issue. The company has concluded a new underwriting agreement with J. P. Morgan & Co., which, in the judgment of officers of the company, will result in the successful subscription of the entire amount of the issue.

"This is also to remind you that the right to subscribe will expire at the close of business on October 1, 1927."

Should the stockholders and debenture holders not take full advantage of their opportunity to subscribe to new preferred stock, employees of the company will be given a similar opportunity to the extent that there is any of the preferred stock available. The company will receive subscriptions from employees to be filled after October 1 from unsubscribed stock. The subscription will be upon the following terms: 5 per cent of the par value to be deducted from payroll every month for twenty months and at the end of that time the stock to be delivered to the subscribing employee with interest allowed upon each payment date at the rate of 7 per cent per annum and an adjustment made upon this basis with any dividend accumulated for the last quarter.

OHIO RIVER & WESTERN.—Abandonment.—This company, which operates a 110-mile 3-ft. gage line from Bellaire, Ohio, to Zanesville, has been authorized to abandon that portion of its railroad between Woodsfield and Zanesville, 68 miles. The company has decided to continue operation of the mileage between Bellaire and Woodsfield, 42 miles. It is expected that the Pennsylvania may take over the mileage between Lawton and Zanesville, nine miles.

PHILADELPHIA, BALTIMORE & WASHINGTON.—Bonds Authorized.—The Interstate Commerce Commission has authorized this company to issue \$3,822,000 general mortgage 4½ per cent bonds, series C, the bonds to be delivered at par to the Pennsylvania Railroad in partial reimbursement for expenditures for additions and betterments and for advances. The Pennsylvania has been granted authority to assume obligation and liability as lessee.

RENSSELAER & SARATOGA.—Stock Sold.—Joseph Walker & Sons have sold 1,000 shares of this company's stock which is guaranteed by the Delaware & Hudson, at 142½, giving a yield of 4.86 per cent. Brown Brothers & Co. and Adams & Peck similarly have sold 8,000 shares at 144, giving a yield of 4.80 per cent. The stock is of \$100 par value and pays 8 per cent dividends, which are guaranteed by the Delaware & Hudson. Actual disbursements to stockholders amount to 6.92 per cent on account of deductions for tax purposes. The stock is not a new issue, but has been acquired from persons who held it over a long term of years.

SOUTHERN.—Branch Abandonment.—The Interstate Commerce Commission, which on October 14, 1925, refused to permit the Southern Railway to abandon a branch line from Morristown, Tenn., to Corryton, 42 miles, on the ground that the line should be continued in operation for a period of one year from October 1, 1925, to permit better determination of its earning power, has again refused to permit the abandonment of the line, but will allow the Southern to renew its application after two years.

WILMINGTON & NORTHERN.—Extension of Bonds Authorized.—The Interstate Commerce Commission has authorized this company to extend from December 1, 1927, to December 1, 1977, the maturity of \$353,500 first mortgage bonds, the interest rate on which will be reduced from 5 to 4½ per cent. The Reading Company, as lessee and owner of 99 per cent of Wilmington & Northern stock, has been authorized to assume obligation and liability.

Average Price of Stocks and Bonds

	Sept. 20	Last week	Last year
Average price of 20 representative railway stocks..	120.76	120.56	103.35
Average price of 20 representative railway bonds..	95.31	95.29	90.90

Dividends Declared

Boston & Maine.—Prior Preference, 1¼ per cent, quarterly; first preferred A, 1¼ per cent, quarterly; first preferred B, 2 per cent, quarterly; first preferred C, 1¼ per cent, quarterly; first preferred D, 2½ per cent, quarterly; first preferred E, 1¼ per cent, quarterly; all payable October 1 to holders of record September 16.

Boston & Providence.—2½ per cent, quarterly, payable October 1 to holders of record September 20.

Cleveland, Cincinnati, Chicago & St. Louis.—Common, \$2.00, quarterly; preferred, \$1.25, quarterly, both payable October 20 to holders of record September 30.

Mahoning Coal Railroad.—Common, \$12.50, quarterly, payable November 1 to holders of record October 24.

Minneapolis, St. Paul & Sault Ste. Marie (Leased Lines).—2 per cent, payable October 1 to holders of record September 20.

Missouri-Kansas-Texas.—Preferred A, \$1.50, quarterly, payable November 1 to holders of record October 15.

New York Central Railroad.—2 per cent, quarterly, payable November 1 to holders of record September 30.

Northern Pacific.—1¼ per cent, quarterly, payable November 1 to holders of record September 30.

Norwich & Worcester.—Preferred, 2 per cent, quarterly, payable October 1 to holders of record September 15.

United New Jersey Railroad & Canal Companies.—2½ per cent, quarterly, payable October 1 to holders of record September 21.

Wabash.—Preferred A, 1¼ per cent, quarterly, payable November 25 to holders of records October 25.

Officers

Operating

Carl V. Berglund has been appointed trainmaster on the Montana division of the Northern Pacific, with headquarters at Livingston, Mont.

R. H. Rice has been appointed chief dispatcher of the North Florida division of the Seaboard Air Line, with headquarters at Tampa, Fla., succeeding J. F. Reitzel, deceased.

E. W. Headland, general yard master on the Pennsylvania at Pittsburgh, Pa., has been promoted to assistant trainmaster on the Cincinnati division, with headquarters at Cincinnati, Ohio.

T. C. Montgomery, conductor on the Texas and Louisiana lines of the Southern Pacific, has been promoted to trainmaster, with headquarters at Yoakum, Tex., succeeding J. H. Smith, who has been transferred to Edinburg, Tex.

Traffic

A. C. Dick has been appointed general agent of the Denver & Rio Grande Western, with headquarters at Trinidad, Colo.

John J. Grogan, general agent in the freight department of the Southern Pacific, with headquarters at Chicago, has been appointed assistant traffic manager of the Western Pacific, with headquarters at the same point, effective October 1. In this newly created position, Mr.



J. J. Grogan

Grogan will have charge of the 23 off-line agencies of the Western Pacific east of Ogden, Utah. Mr. Grogan was born on July 26, 1888, at Chicago, and entered railway service at an early age as a clerk in the Wood street yard of the Chicago & North Western at Chicago. Later he was employed in the freight department of the St. Louis, Rocky Mountain & Pacific (now a part of the Atchison, Topeka & Santa Fe) and, in

September, 1910, he entered the employ of the auditor's office of the Chicago, Rock Island & Pacific. In May, 1911, he became a freight solicitor on the Rock Island at Chicago, where he remained until October 1, 1920, when he was appointed freight solicitor for the El Paso & South Western at Chicago. When the E. P. & S. W. was acquired by the Southern Pacific on December 1, 1924, Mr. Grogan became district freight agent for the latter railroad at Chicago. In March, 1926, he was promoted to general agent, with headquarters at Chicago, a position he has held until his appointment as assistant traffic manager of the Western Pacific.

Fred P. Stafford, traveling freight agent for the Union Pacific at Des Moines, Iowa, has been appointed acting general agent, with headquarters at that point.

Robert Johnston, chief clerk in the general passenger department of the Canadian Pacific at Montreal, Que., has been promoted to assistant general passenger agent of the Eastern lines, with headquarters at the same point, succeeding **Fred O. Hopkins**, who retired from active service on July 1.

Mechanical

M. A. Smith, assistant superintendent of motive power of the Pittsburgh & Lake Erie and the Lake Erie & Eastern, with headquarters at McKees Rocks, Pa., has been appointed superintendent of motive power, with headquarters at Pittsburgh, Pa., succeeding **David J. Redding**, who has been placed on the retired list at his own request after 44 years of service. **Karl Berg**, shop superintendent at McKees Rocks, has been appointed assistant superintendent of motive power, with the same headquarters, succeeding Mr. Smith. **H. Courtney**, mechanical engineer at Pittsburgh, has been appointed shop superintendent at McKees Rocks, succeeding Mr. Berg, and **C. H. McConnell**, electrical engineer at Pittsburgh, has been appointed mechanical engineer, with the same headquarters, succeeding Mr. Courtney.

Purchases and Stores

M. E. Bailie, division storekeeper on the Missouri Pacific, with headquarters at Kansas City, Mo., has been promoted to district storekeeper, with headquarters at St. Louis, Mo., succeeding **E. A. Porter**, who has been appointed division storekeeper, with headquarters at Monroe, La. **W. R. Caldwell**, division storekeeper at Monroe, has been transferred to Kansas City, to succeed Mr. Bailie.

Harry R. Duncan, who has been promoted to superintendent of timber preservation of the Chicago, Burlington & Quincy, with headquarters at Galesburg, Ill., was born on June 14, 1890, at Willard, Ohio. He entered railway service in September, 1908, on the Baltimore &

Ohio, becoming a clerk in the store department of the Burlington at Aurora, Ill., a year later. In August, 1911, he was transferred to the office of the general storekeeper at Chicago where he remained until April, 1915, when he was advanced to chief clerk to the division storekeeper at Galesburg. Mr. Duncan became chief clerk to the division storekeeper at Aurora in February, 1916, and a year later he was promoted to general foreman in the store department at Havelock, Neb., where he remained until March, 1918, when he was again pro-



Harry R. Duncan

moted to division storekeeper at Plattsmouth, Neb. In September, 1920, he was appointed general piece work inspector on the staff of the general storekeeper, with headquarters at Chicago, being promoted to inspector of stores on the staff of the general storekeeper at Chicago in May, 1922. Mr. Duncan was again promoted to traveling storekeeper on the staff of the general storekeeper in December, 1926, a position he held until his further promotion to superintendent of timber preservation on September 1. Since his original employment with the Burlington in November, 1909, Mr. Duncan has been continuously in the service of that company.

Special

J. H. Hustis, Jr., assistant to vice-president of the New York Central, with headquarters at New York City, has been appointed manager of the New York Central building at Park avenue between 45th and 46th streets, New York City. He will have charge of all matters relating to the leasing, maintenance and operation of the building.

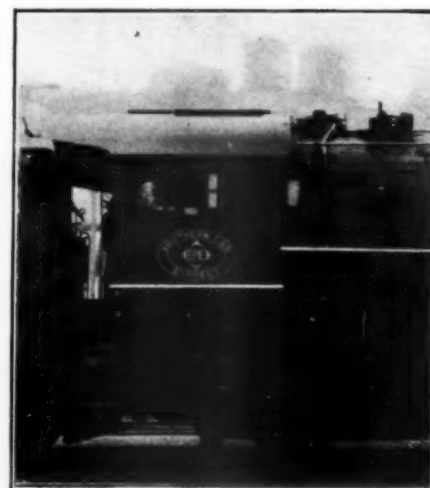
Obituary

W. P. Hood, superintendent of the Knoxville & Augusta, the Knoxville & Bristol and the Tennessee & Carolina Southern (part of the Southern), with headquarters at Knoxville, Tenn., died on September 13 at the Knoxville General Hospital.

Frank J. Kraemer, division master mechanic on the Missouri Pacific until his retirement from active service in 1924, died at Little Rock, Ark., on September 13. Mr. Kraemer served from 1906 to 1924 as master mechanic at Baring Cross, Ark., at Little Rock and at Argenta and at Atchison, Kan.

James S. Harlan, formerly a member of the Interstate Commerce Commission died at his summer home in Essex, N. Y., on September 20. Mr. Harlan was born on November 24, 1861, at Evansville, Ind., and was graduated from Princeton University in 1883. He studied law at Chicago from 1884 until 1888, in the office of Melville W. Fuller (later chief justice of the Supreme Court of the United States). He was admitted to the bar in 1886. He practised law in Chicago with the firm of Gregory, Booth & Harlan, and from 1901 until 1903 was attorney-general in Porto Rico. From August 17, 1906, until December 31, 1918, Mr. Harlan was a member of the Interstate Commerce Commission.

J. Ross Clark, second vice-president of the Los Angeles & Salt Lake, from its organization in 1901 as the San Pedro, Los Angeles & Salt Lake until 1921, died on September 18 at his home in Los Angeles, Cal., after a year's illness. Mr. Clark served as a director of the L. A. & S. L. from 1901 until the time of his death. He was born on April 10, 1850, at Connellsville, Pa., going West in 1870 and engaging in banking, mining and beet sugar raising and other enterprises until his connection with the S. P., L. A. & S. L. in 1901. From 1907 to 1914, Mr. Clark was president of the Las Vegas & Tonopah (now dismantled). In 1914 when the L. V. & T. was dismantled and taken over by the Bullfrog Goldfield, he served as president of the latter company until 1917. During his railroad connections, Mr. Clark maintained headquarters at Los Angeles.



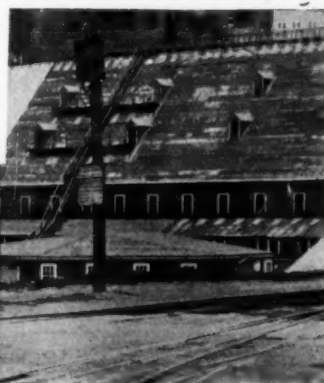
Red and Gold Lettering on Cab of an Erie Locomotive



Railway Age

Motor Transport Section
Devoted to the
Coordination of Railway and Highway Service

Vol. 83 September 24, 1927 No. 13



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PERFORMANCE COUNTS

Railway Age

Motor Transport Section

*Devoted to the
Co-ordination of Railway and Highway Service*

Vol. 83, No. 13

September 24, 1927

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A. E. R. A. Convention Worth Attending

THE annual convention of the American Electric Railway Association, which will be held at Cleveland, Ohio, on October 3-7, will have many features which will render its attendance by officers of steam railways worth while. The electric railways have been operating motor buses to supplement and replace their rail service for a considerably longer time than most steam railways, and their experience in the coordination of railway and highway transportation has been interesting. Each year, more and more time has been given in their conventions to the problems of motor bus operation, and the convention this year will be no exception. Numerous committee reports on the various phases of bus operation and of bus and train coordination will be presented. All of them contain information which steam railway operators of buses or potential operators of buses should find it to their advantage to have. Of fully as great interest and value as the committee reports, however, are the exhibits of motor buses and motor bus equipment which will be displayed in connection with the convention. These exhibits will include not only the newest designs in motor buses but the most modern equipment of all kinds which is used in the operation and maintenance of the buses. The electric railway convention provides the only opportunity which will be available this year to see such a display of modern motor buses and bus equipment. For this reason a larger attendance of steam railway officers than ever is anticipated at this convention.

Frequent Schedules as an Attraction for Short-Haul Business

WE wonder if perhaps a general rule regarding the travel preferences of the public may be drawn from observing the volume of traffic of competing suburban buses in a territory like New York. These buses—or some lines at least—apparently do their best business at times when the railroads do the least, i.e. in the non-rush hours when train service is relatively infrequent. During rush hours, apparently, the greater frequency of train schedules and the accelerated express service are sufficient to attract the full fare passenger to the train. If these observations are true is it not, probably, safe to say that the bus's outstanding advantage as a traffic getter is that it begins to show a profit with 10 passengers or even less, whereas a steam train must have three or four times that number? Hence for a given volume of business three or four times as many

schedules may be run with a bus as would be possible with trains. No one will lose sight of the fact that the common carrier—railroad, bus or trolley—which seeks short-haul business, has as its chief competitor the private automobile. The competitive strength of the private automobile lies in its constant availability—the owner does not have to wait to begin his journey. From this does it not follow that the form of transportation which can approach this availability most closely by providing the most frequent service will compete most successfully with the private automobile for the short-haul passenger? The greater degree of popularity of train service with the full fare passenger when frequent scheduled service for commuters is being given tends to bear out this view.

Train, Rail Car and Bus Costs on the Boston & Maine

THE Boston & Maine has analyzed the cost of operation of its steam passenger trains, its gasoline rail cars and its motor buses with interesting results. It places the cost of operating a steam passenger train, without any charge for roadway or rail maintenance, at \$1.589 per mile. The cost of operating gasoline rail cars on the same basis is \$0.72 a mile, and the operating cost of Boston & Maine motor buses is \$0.289 a mile. Thus, the Boston & Maine finds that it can operate five motor buses for the cost of operating one steam passenger train, and approximately $2\frac{1}{2}$ motor buses for the cost of operating a gasoline rail car. The most striking differences in the cost of train and bus operation are in the wages, fuel, repairs and tax items. The wage cost per mile of train operation on the B. & M. is 38.7 cents, while the wage cost per bus mile is only 4.574 cents. The fuel cost of train operation is 23.7 cents per mile, and of bus operation only 3.343 cents per mile. The repair cost per train mile of 58.8 cents compares with a repair cost per bus mile of 5.359 cents, while taxes and fees per train mile of 12.6 cents contrast with taxes and fees per bus mile of 1.265 cents. Being one of the largest railway operators of buses and gasoline rail cars and serving a region of great traffic density, the Boston & Maine is in an unusually favorable position to analyze the cost of these various services. Additional significant cost analyses may be expected from other railways as their tests of the rail car and the motor bus continue. Only through such tests can sound judgment be rendered as to the specific places on a railway where the steam passenger train, the gasoline rail car and the motor bus, respectively, offer the logical agency to be utilized.

Motor Transport at the Iron Horse Fair

IN Section I of the *Railway Age*, with which this issue of the *Motor Transport Section* appears, is an article describing the plans for the Baltimore & Ohio's centenary celebration which opens today, September 24, at Halethorpe, near Baltimore. The "Fair of the Iron Horse," as this exhibition and pageant is called, traces the development of transportation from the days of the Indian down to the present. And, as evidence of the thoroughness with which the railroad is doing its job, it is not neglecting to include the motor vehicle in its panorama of transportation. In the pageant will move motor trucks, which the road uses as an adjunct to its trains in increasing the efficiency of freight service, and the motor coach will be used in what promises to be one of the most dramatic scenes in the pageant. One of the features of this spectacle will be a complete train representing the road's "Capitol Limited." As this train reaches the grand stand, it will stop and its passengers will alight, transferring to motor coaches representing the train connection service at New York. Few of the railroad's activities will fail of portrayal at Halethorpe, and it will be gratifying to those railroad men who are interested in rail-highway co-ordination to see that this important new phase of railroad enterprise is well displayed.

Lack of Uniformity in Railway Bus Fares

INQUIRIES addressed to a number of officers in charge of railway motor bus operations have brought out the fact that there is an extraordinary lack of uniformity in the rates of fare charged for transportation on their lines. As was to be expected, the rate of 3.6 cents per mile charged for transportation on steam passenger trains is the rate which applies on a substantial number of the railway buses, but, as described in an article in this issue of the *Motor Transport Section*, a number of the other railway bus lines have rates ranging from as low as 2¼ cents to as high as 5 cents per mile. Most of the railways charging 3.6 cents per mile for transportation on their buses have fixed this rate because of their substitution of bus service for train service or because of an effort to further the coordination of rail and bus service by making tickets which cost the same amount interchangeable on their buses and trains. Railways having lower rates of fare on their buses have fixed them at minimum levels practically without exception on account of competition, either from independent bus lines or from what has been described as the "keenest competition in the world, the private automobile."

It has been the experience of most bus operators that under average conditions bus operation cannot be carried on at a profit if the rate of fare is any lower than 3½ cents a mile. Something over expenses can be earned at a lower rate of fare only when the traffic handled is heavy. The roads which have established low rates for transportation on their buses have usually done so in the belief that heavy traffic can be obtained only by such low rates, although some lines have been forced to keep their fares at the minimum level on account of the competition of other bus lines. Bus operation by

railways should be carried on at a profit. To accomplish this bus fares should be neither so low as to render impossible the earning of something more than expenses, nor so high as to preclude the possibility of securing the maximum traffic. Since conditions in various parts of the country differ, there is little likelihood that there will ever be one nation-wide uniform rate of fare for transportation on buses. The ideal rate under given conditions probably will have to be determined by trial, and the safest course for railways to pursue at the outset of bus operation would appear to be to fix their rates on a basis of 3.6 cents per mile, this being neither high nor low.

The Future of the Motor Transport Conference

AS we go to press, a meeting of the directors of the American Railway Association, scheduled for September 22, is to act upon the proposal of the Railroad Motor Transport Conference that it become a division of the association. The action of the executive committee of the A. R. A. is expected to be favorable, the question of the proposed affiliation having been submitted to the member roads of the association by letter ballot last spring, resulting in a vote which is understood to have been in favor of taking the motor transport conference into the association. Thus it appears that the conference, which has suffered the set-back of months of inactivity, may very soon take up again the work of showing the way toward the co-ordination of railway and highway transportation, for which it was organized.

The Railroad Motor Transport Conference had its inception in June of last year. It held only two additional meetings after the first one, one in August last year and the other in December. Since then it has marked time awaiting the action of the American Railway Association on its proposal of affiliation with the latter organization. In the first three meetings of the conference it was not to be expected that it would hit its full stride, and it did not, but in those three meetings it showed an enthusiasm for its work which promised a successful future.

There was an urgent need for the motor transport conference a year ago and there is an even more urgent need for it today. The number of roads which are experimenting with the operation of buses and trucks has greatly increased. The trend of highway transportation is changing rapidly and in ways which will vitally affect the railways not only with respect to their purely railway affairs but with respect also to their prospective operation on the highways. The sharing of experience with experimental bus and truck operation and joint consideration of the new developments are highly desirable, and can best be accomplished through the motor transport conference.

If the anticipated favorable action of the American Railway Association materializes, immediate steps to get the conference going again are expected to be taken by its officers, and this is obviously desirable. An inactivity of nearly a year might ordinarily have proved to be a death blow to such an organization, but this is not at all to be expected in the case of the motor transport conference. The work which it can do is greater than ever, as is the interest of its members. The call of an immediate meeting of the conference should find it ready at once to swing into its stride.

Railway Bus and Truck Operation Tabulated

Fifty-two roads operate over 800 buses, while 46 use over 3,300 trucks, tractors and trailers

THE following tabulations present a picture of the extent to which the steam railways have adopted the motor bus and the motor truck. They show that on July 1, 52 railways, about half of which are Class I carriers, were operating more than 800 motor buses. On 44 of these, buses were used in line service, about two-thirds to supplement train service and the remainder to replace train service. Four railways were operating buses in terminal or city service, two in tours service and six for the transportation of employees. The aggregate route mileage of the steam railway bus lines was a little more than 8,000.

The truck tabulation lists 31 railways using trucks, tractors and trailers for the transportation of freight. It does not include the railways at St. Louis, Mo., and Cincinnati, Ohio, which contract with the Columbia Terminals Company and the Cincinnati Motor Terminals

Company, respectively, for transfer service in those cities. Counting these railways in addition to those mentioned in the tabulation, the number of railways operating trucks, tractors and trailers on July 1, was 46. They were using 2,466 trucks, 213 tractors and 753 trailers. Forty one of the railways use such equipment for the transfer of freight in terminals, 17 to facilitate line hauls and 3 to provide store door delivery. The railways operate this equipment in 259 cities and line sections. Seven of the railways operate trucks through subsidiary companies. 40 have contracts with outside truckmen, and 3 operate trucks directly, some of the lines using more than one method.

Of the railways operating buses, 28 do so through subsidiary companies, 6 under contracts with outside bus lines and 20 through their own companies.

The tabulations follow:

Railway Motor Bus Operation

Railway	No. of Buses Operated	Nature of Service	Location of Service	Miles of Line	Operator
Alabama, Tennessee & Northern	2	Line—Supplementary	Millry, Ala., and Cullomburg to Healing Springs and Bladon Springs	5	Railway
Amador Central	1	Line	Martell, Cal., to Jackson	5	Railway
Atchison, Topeka & Santa Fe	30	Line—Supplementary; Tours	Lamy, N. M., to Santa Fe, and vicinity	310	Subsidiary—Santa Fe Trans- portation Co. (Fred Harvey) Railway
Atlanta, Birmingham & Atlantic	1	Employee Transportation			
Baltimore & Ohio...	26	Terminal	Jersey City, N. J., to New York and Brooklyn; Elizabeth, N. J., to Newark	20	Subsidiary — West Virginia Transportation Co. Contrac- tor—Fifth Avenue Coach Co. N. Y.
Bangor & Aroostook	1				Subsidiary—Bangor Investment Co.
Boston & Maine.....	68	Line—Supplementary and Replacement	Throughout B. & M. territory...	1,000	Subsidiary—Boston & Maine Transportation Co.
Cadiz	2	Line	Cadiz, Ky., to Hopkinsville.....	25	Railway
Canadian Pacific	3	Line—Supplementary	Galt, Ont., to Preston	5	Subsidiary — Canadian Pacific Transport Co.
Central of New Jersey	2	Line—Replacement	Lakewood, N. J., to Barnegat....	25	Subsidiary — Jersey Central Transportation Co.
Chattahoochee Valley	1	Line—Replacement	West Point, Ga., to Bleacher	27	Subsidiary — Chattahoochee Valley Transportation Co.
Chesapeake & Ohio..	4	Employee Transportation	Covington, Ky., to Stevens	10	Contractor—Southland Trans- portation Co. Covington, Ky.
Chicago & Alton	8	Line—Supplementary	Jacksonville, Ill., to St. Louis; also two short sections	125	Subsidiary—Alton Transporta- tion Co.
Chicago, Milwaukee & St. Paul	2	Line—Replacement	Racine, Wis., to Sturtevant	8	Railway
Colorado & Southern	16	Line—Supplementary and Replacement	Denver, Colo., to Boulder and vicinity; Denver to Pueblo....	155	Subsidiaries—Denver & Inter- urban Motor Co.; Denver- Colo. Springs-Pueblo Motor Way
Copper Range	10	Line—Supplementary	Painesdale, Minn., to Lake Linden	22	Subsidiary—Copper Range Mo- tor Bus Co., Inc., Houghton, Mich.
Delaware Valley	5	Line	East Stroudsburg, Pa., to Bush- kill	13	Subsidiary — Delaware Valley Transportation Co.
Denver & Rio Grande Western	30	Line—Supplementary and Replacement	Denver, Colo., and vicinity; Grand Junction and vicinity; Salida and vicinity	500	Subsidiaries —Denver-Colorado Springs-Pueblo Motor Way, Inc.; Western Slope Motor Way, Inc.; Rio Grande Mo- tor Way, Inc.
Fonda, Johnstown & Gloversville	1	Line—Supplementary	Gloversville, N. Y., and vicinity	86	Subsidiary

Railway	No. of Buses Operated	Nature of Service	Location of Service	Miles of Line	Operator
Graysonia, Nashville & Ashdown	2	Line	Nashville, Ark., to Ashdown	40	Railway
Great Northern	165	Line—Supplementary and Replacement	All parts of Minnesota and into adjacent states	3,000	Subsidiary—Northland Trans- portation Co.
Little River	1	Line	Townsend, Tenn., to Walland	8	Railway
Maine Central	5	Line—Supplementary and Replacement	Portland, Me., to Harrison; Bangor to Bar Harbor	90	Subsidiary—Sam Oset Co.
Middletown & Union- ville	2	Line—Supplementary	Middletown, N. Y., to Sussex, N. J.	22	Subsidiary — Middletown & Sussex Transit Corp.
Minnesota Western...	4	Line—Replacement	Minneapolis, Minn., to Watertown	30	Railway
Missouri-Kansas- Texas	2	Employee Transportation			Railway
Missouri Pacific.....	6	Line—Supplementary	Pueblo, Colo., to Ordway	55	Contractor—San Isabel Trans- portation Co.
Nashville, Chatta- nooga & St. Louis	3	Line—Replacement	Tracy City, Tenn., to Cowan	27	Subsidiary—N. C. & St. L. Motor Transit Co.
New York Central..	81	City and Suburban	Northern New York	337	Subsidiary—N. Y. State Rail- ways
New York, New Haven & Hartford	190	Line—Supplementary and Replacement	41 routes in Conn., Rhode Island and Mass.	1,100	Subsidiary—New England Transportation Co.
Norfolk Southern ..	3	Line—Supplementary	Norfolk, Va., to Virginia Beach.	30	Subsidiary—Norfolk Southern Bus Corp.
Oregon - Washington R. R. & Nav. Co...	8	Line—Supplementary and Replacement; City Service	Portland, Ore., to Pendleton; Pendleton, Ore., to Walla Walla, Wash.; Yakima, Wash. ...	275	Subsidiaries — Union Pacific Stages; Yakima Transporta- tion Co.
Pajaro Valley Con- solidated	2	Line	Spreckels, Cal., to Salinas	5	Railway
Paris & Mt. Pleasant	1	Line	Paris, Tex., to Mt. Pleasant	50	Railway
Pennsylvania	8	Line—Supplementary and Replacement	Chambersburg, Pa., to Piney Mountain; Manor, Pa., to Bo- quet	19	Contractor—Scott Bros., Inc., Philadelphia, Pa.
Quebec, Montreal & Southern	3	Line—Supplementary	Sorel, Que., to St. Lambert and St. Hyacinthe	81	Railway
Reading	5	Line—Supplementary	Three routes, eastern Pennsylvania	35	Subsidiary—Reading Transpor- tation Co. (E. D. Osterhout)
Richmond, Fredericks- burg & Potomac...	2	Employee Transportation			Railway
Rutland	2	Line—Replacement	Chatham, N. Y., to Bennington, Vt.	58	Subsidiary—Rutland Transpor- tation Corp.
San Joaquin & East- ern	4	Line—Feeder	Big Creek, Cal., to Huntington Lake	11	Subsidiary
Seaboard Air Line..	6	Line—Feeder; City	Rutherfordton, N. C., to Lake Lure; Savannah, Ga.	25	Subsidiary—Motor Transporta- tion Co. of the South
Southern	2	Employee Transportation	Knoxville, Tenn.	5	Railway
Southern Pacific	18	Line—Supplementary; City; Employee Transportation	Battle Mountain, Nev., to North Battle Mt.; Boulder Creek, Cal. to Santa Cruz; Salem, Ore. ...	42	Subsidiary — Southern Pacific Motor Trans. Co. Contractor —W. C. Hancock, Battle Mountain, Nev.
Spokane, Portland & Seattle	36	Line—Supplementary	Portland, Ore., to Seaside	135	Subsidiary—S. P. & S. Trans- portation Co.
Tama & Toledo.....	5	Line—Supplementary	Toledo, Iowa, to Tama	4	Railway
Tennessee & North Carolina	1	Line—Supplementary	Crestmont, N. C., to New Port Junction	21	Railway
Tennessee, Kentucky, & Northern	2	Line—Supplementary	Livingston, Tenn., to Algood....	19	Railway
Tuckaseegee & South- eastern	1	Line—Supplementary	East La Parte, N. C., to Sylva	12	Railway
Union Pacific	39	Tours	Cedar City, Utah, to Zion Natl. Park and North Rim, Grand Canyon; Death Valley	250	Subsidiary—Utah Parks Co.
Verde Tunnel & Smelter	1	Line—Replacement	Clarkdale, Ariz., to Jerome.....	7	Contract
Virginia & Truckee..	2	Line—Supplementary	Carson City, Nev., to Reno, Minden and Mound House	56	Railway
Yreka	1	Line—Supplementary	Yreka, Cal., to Montague	8	Railway

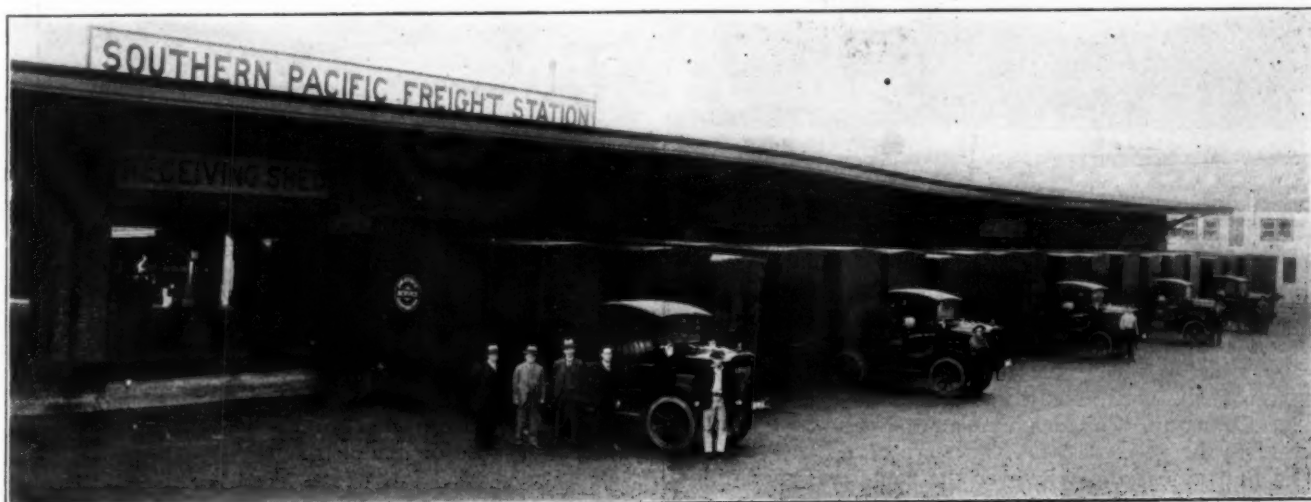
Railway Motor Truck Operation

Railway	Number of Units Operated			Nature of Service	Location of Service	Operator
	Trucks	Tractors	Trailers			
Ann Arbor		2	5	Terminal	Toledo, Ohio	Contract
Atchison, Topeka & Santa Fe		10*	60*	Terminal	Oakland, Cal.	Contract
Atlantic Coast Line.	8			Terminal	Norfolk, Va., Suffolk, Va., Fayetteville, N. C., Plymouth, N. C., Dothan, Ala., Montgomery, Ala., Gainesville, Fla.	Contract

*Indicates equipment used jointly with other railways.

Railway	Number of Units Operated			Nature of Service	Location of Service	Operator
	Trucks	Tractors	Trailers			
Baltimore & Ohio ..	100	5	10	Terminal and Line	New York; Baltimore, Md., to Washington, D. C.	Contract
Boston & Maine	33	6	12	Terminal and Line	Boston, Mass., and vicinity; Lowell, Mass., and vicinity	Contract
Bristol Railroad	1			Terminal	Rutland, Vt.	Railway
Buffalo, Rochester & Pittsburgh	2			Terminal and Line	Rochester, N. Y., to Gainesville, 54 miles	Contract
Canadian National ..	200			Terminal	Montreal, Que., and other points	Subsidiary—Canadian Natl. Transfer Co.
Chesapeake & Ohio.	10			Terminal and Line	Cincinnati, Ohio, and vicinity	Contract
Chicago, Rock Island & Pacific		1	4	Terminal	Chicago	Subsidiary—Rock Island Motor Transit Co.
Chicago Tunnel Company		2	10	Store Door Delivery	Chicago	Subsidiary—Chicago Tunnel Trans Co.
Delaware, Lackawanna & Western.	50	3	7	Terminal	Hoboken, N. J., and six other points	Contract
Denver & Rio Grande Western	9			Line	Grand Junction, Colo., and vicinity; Salida, Colo., and vicinity	Subsidiary — Western Slope Motor Way, Inc.; Rio Grande Motor Way, Inc.
Detroit & Mackinac	1			Line	88 mile route	Contract
Erie	181	15	58	Terminal and Line	20 sections and points	Contract
Great Northern		3	17	Terminal	St. Paul, Minn.	Contract
Lehigh Valley	50			Terminal and Line	New York and nine other points and sections	Contract
Long Island	4	5	29	Terminal and Line	Brooklyn and all lines, Long Island	Contract
Maine Central	7			Line	Portland, Me., and vicinity	Subsidiary—SamOset Company
Michigan Central...	20			Line	Detroit, Mich., to Monroe; Battle Creek, Mich., to Niles	Contract
Nashville, Chattanooga & St. Louis	2			Line	Tracy City, Tenn., Branch	Subsidiary—Nashville, Chattanooga & St. Louis Motor Transit Co.
New York Central..	1,500 (Included in truck fig.)			Terminal and Line	100 sections and terminals—all lines	Contract
New York, Chicago & St. Louis		3	9	Terminal	Cleveland, Ohio	Contract
New York, New Haven & Hartford	100			Terminal	New York, New Haven, Conn.	Contract
Pennsylvania	57	19	73	Terminal and Line	Philadelphia, Pa.; Baltimore, Md., New York; 40 line sections	Contract
San Joaquin & Eastern	2			Line	Big Creek, Cal., to Huntington Lake	
Southern Pacific ..	2	6*	60*	Terminal and Line	Oakland, Cal.	Contract
Southern Pacific Texas Lines	75			Terminal and Line	Houston, Tex., and 46 other points	Contract
Virginian	2			Terminal	Roanoke, Va.	Contract
Wabash		4	10	Terminal	Chicago	Contract
Western Pacific		10*	60*	Terminal	Oakland, Cal.	Contract

*Indicates equipment used jointly with other railways.



Part of the Fleet of Tractors and Semi-Trailers Operated at Oakland, Cal., for the Southern Pacific by the Drayage Service Corporation



Beach with City of Acre in Background

Buses Conquer the Syrian Desert

Weekly service operated on 600-mile route from Beyrout to Baghdad—Specially designed six-wheel coaches used

By A. P. Warner

Assistant General Sales Manager, the Six-Wheel Company, Philadelphia, Pa.

A REGULAR weekly motor bus service between Beyrout, on the shore of the Mediterranean Sea in French Syria, across the Syrian desert to Baghdad, a distance of 600 miles, has been operated since October, 1923, by the Nairn Transport Company.



Road Along Mediterranean Sea Between Beyrouth and Tripoli

This line was organized primarily to cut the time required to carry mail from Baghdad to London from 24 days to 8 or 10 days. The regular service was established only after innumerable difficulties had been overcome by Norman and Gerald Nairn, the two young New Zealanders who organized the line. The equipment used consists of six-wheel buses manufactured by the Six-Wheel Company, Philadelphia, Pa., which were constructed to the design of the Nairn brothers.

The first pioneering trip over the route was made in April, 1923, and was accomplished, after many difficulties, in four days. This trip proved the feasibility of crossing the desert in motor cars, but served also to show the difficulties that would be encountered in the

operation of a regular service as a commercial proposition, to convey passengers, goods and mails and to cope with the blasting heat of the summer and the torrential rains, which turn the desert into a quagmire of liquid mud. Other trial runs were completed successfully, however, in the ensuing months and when regular weekly service began in October, 1923, the Nairn Transport



Cap of the Nairn Bus Route Across the Syrian Desert

Company had a contract with the British government for the conveyance of mail.

Road Conditions Discouraging

A description of the "road" conditions encountered on the Beyrout-Baghdad route will serve to indicate part of the difficulties encountered in the operation of this

line. From Beyrout excellent roads are maintained over the Lebanon mountains by the French authorities. There are many severe gradients and sharp hairpin curves. For a few miles the country is highly cultivated, but after about 25 miles, cultivation gives place abruptly to barren desert, and the road, which soon deteriorates considerably, comes to an end and is replaced by a desert track formed by the wheels of preceding cars. There is little of the soft sand typical of the Sahara near Cairo, the surface being hard and stony, often strewn with boulders. Later the ground slopes toward the valley of the Euphrates and the gravel surface gives place to dry alluvial mud, sometimes covered with camelthorn, at times cracked and uneven, forming an atrocious surface, and yet again, in places as smooth as the finest road. The valleys of the Euphrates and Tigris rivers are merely enormous dry mud-flats, which, after heavy rain, provide very difficult going.

Present Route

The present route starts from Beyrout and follows along the Mediterranean coast to Tripoli, where it turns inland to Homs on the Orentes river. Soon after leaving Homs, the desert proper is encountered and traversed to Palmyra where a stop is made at a hotel owned and operated by the Nairn Transport Company. From Palmyra to Rutba Wells, a winding track is followed across the desert. Strange to say, this portion of the desert is a mass of green vegetation during the winter months. Rutba is reached about 6 p. m. in the evening and a stop is made here for a night at a comfortable rest house provided by the Nairn Transport Company. From Rutba to Ramadi on the Euphrates numerous dry watercourses are crossed and all along the way the remains of abandoned cars are seen, whose owners attempted to make the desert crossing and failed. From Ramadi, Baghdad is reached via Fellujah, where the Euphrates river is crossed on a pontoon bridge.

Special Vehicle Required

The vehicle used by the Nairn Transport Company had to be capable of carrying the necessary heavy loads of gasoline, baggage, mails, etc., and of providing accommodations for two drivers working in shifts. These two requirements were necessary for efficiency. Eco-



40 Miles an Hour on the Desert, 100 Miles from Water

nomical running costs demanded large seating capacity, which meant a large and heavy car, which in turn meant certain trouble in sand and mud unless the weight per square inch of tire surface on the ground was not more than in the case of the cars already employed. The six-wheeler offered a possible solution. Mr. Nairn visited America, and in conjunction with the Six-Wheel Company of Philadelphia, evolved a likely design.

For passenger service, a chassis powered with a 105 hp., six-cylinder motor was purchased. The transmis-

sion of this bus is so designed to give eight forward speeds and two reverse. Normal operating speed of the bus is 50 miles per hour, and the total gear reduction in low gear is 60 to 1. The comfortable riding speed over the desert, Mr. Nairn states, is from 35 to 40 miles per hour. On the front end of the chassis are mounted large type air springs; a standard radiator is used with attached reflow tank and condenser; a large shroud is attached to the radiator shell and a special shroud is fitted to carry heated air away from the rear of the motor.

The first trip across the desert was made without the addition of any water, in temperatures which ran as



Bedouin Police, the "Traffic Cops" of the Desert

high as 125 deg. F. Mr. Nairn stated that at one part of the trip they were forced to run in low gear for a space of about eight miles and no trouble was experienced with overheating.

Gasoline capacity is 125 gal., tanks being mounted at the rear and built into the body. The brakes are power-operated, and tires are 40 in. by 10.50 in. balloons, two spares being carried, one on either side at the front of the body.

The roof construction is somewhat different from that of ordinary motor buses, in that it has a capacity of 2,500 lb. of baggage. The roof bows are of one-piece steam-bent wood supported by forged steel strips and tied together with steel tape, extending from the front to the rear of the bus roof, this tape being 1½ in. wide and being spaced on 6 in. centers. This is covered with chicken wire with wadding on top of the wire, and then a heavy double fabric, coated in the center with rubber. Over the top of this, oak strips are screwed over the entire roof so that the sharp corners of trunks, boxes, etc., will not tear the covering.

The interior of the bus is trimmed in a dark green leather of a shade designed to minimize the glare of the desert sun. Dark green roller type pull curtains are installed at all windows. A Pullman type toilet is installed at the rear of the bus. The seating capacity is 13 first class and 2 second class passengers, the chairs being of special construction, practically as large as the ordinary Pullman chair in a steam railway coach and the back high enough so that passengers can recline and sleep as they ride.

Bus Completely Equipped

Owing to the distances that this bus travels, Nairn sends it out very completely equipped. This is particularly necessary, as there are times when the bus is 100 miles from water or any human habitation. At the forward end of the bus, beside the front fender, a 35 gal. water tank for drinking purposes is carried and above the gas tank on the rear of the bus, there is a dustproof compartment containing emergency food rations for each passenger. These emergency rations are in addition to

the regular food supply which is carried inside the bus and served while en route.

The entire floor of the bus is removable in a few moments' time, being made with a special locking arrangement so that it can be removed at the end of each trip. Special attention has been given to rendering the body as nearly dust-proof as possible. The detachable flooring of the bus body is of dovetailed construction, and these joints are set in rubber to prevent sand from sifting up while in motion. All joints at the front end of the body, including doors, are sealed with soft rubber strips.

Extraordinary Care in Maintenance

It is interesting to note the care with which the Nairn Transport Company operates its vehicles. At the end



Passing Through the Village of Homs

of every 600-mile run, the bus comes in and the following inspection is regularly given the job: All six wheels are removed, grease cleaned from wheel bearings, wheel bearings are inspected and wheels repacked with grease and adjusted. The cylinder head is removed from the motor and valves inspected. Oil is drained and fresh oil installed. Driveshafts are checked and packed with grease.

Rear axles are checked and packed with grease. Every week the crankcase is removed, bearings checked, rings and wrist pins checked, worm carriers removed and worms, worm wheels and bearings checked. Transmission top removed, transmission drained and transmission

bearings and gears inspected. This careful inspection is also given the commercial vehicles, which the company is operating under contract with the Irak and British governments for the carrying of mail, and a heavy penalty is imposed if the mail is delayed. So far as Nairn has not had to pay a single penalty.

At Damascus a garage is being erected which will include such modern equipment as a quasi-arc electric welding outfit, a 200-lb. air compressor, a spray-painting equipment, hydraulic jacks, overhead electric cranes, and electric lathes, grinders, drills, valve grinders, hacksaws, vulcanizers and battery chargers.

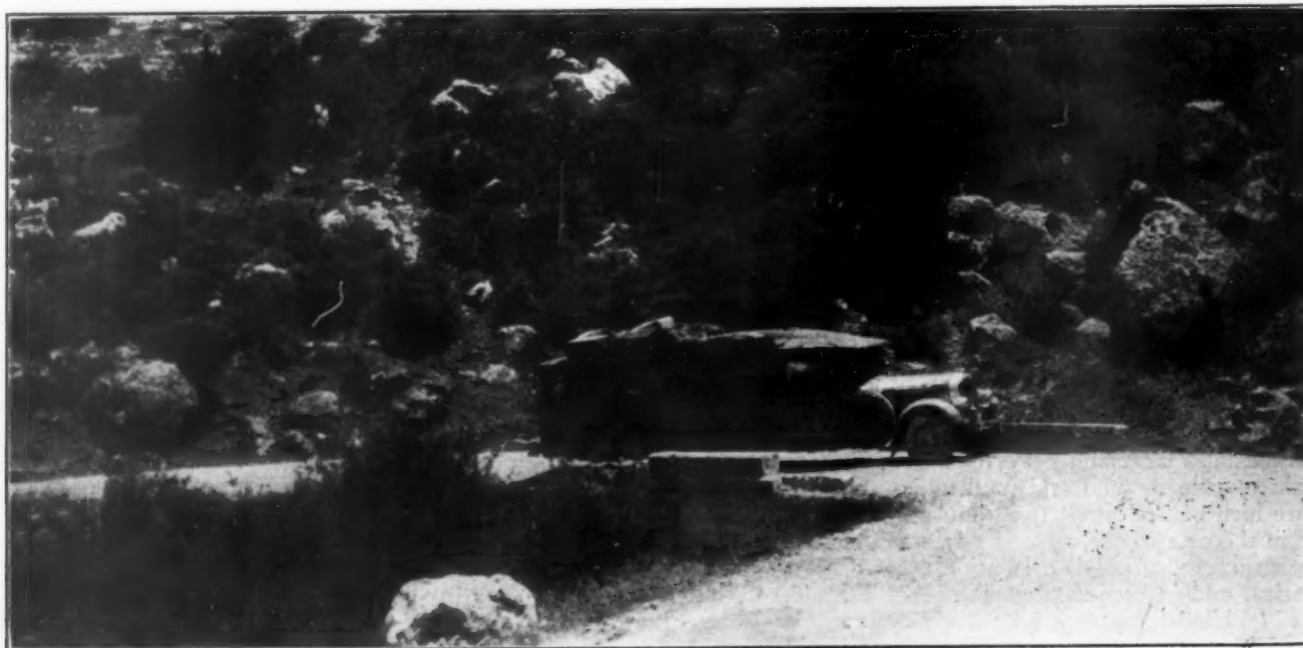
Truck Body on Bus Chassis

The commercial vehicles use the same chassis as the passenger vehicles and special precautions have been taken to render these bodies absolutely dust-proof. Unusually luxurious cabs are furnished, seating five persons, and if necessity arises, several passengers can be carried with real comfort. Bodies are 18 ft. 7 in. long, 7 ft. 2 in. wide and 6 ft. 6 in. high.

Ownership of Company

Recently a strong combine has taken over the Nairn Transport Company. This new Anglo-French combine consists of the Anglo-Persian Oil Company, Ltd., the Ottoman Bank, the Imperial Bank of Persia, Stern Brothers of London, the Banque de Paris et Pays Bas, the Credit Francaise d'Algerie, the Banque Ottoman and the Messageries Maritimes of Paris. Norman Nairn, who made the desert route a success, will be managing director in Beyrout.

THE RIGHT of the Oklahoma Corporation Commission to regulate bus and truck lines in that state has been upheld by the Supreme Court of Oklahoma. "The law is based on the theory that the individual citizen has no vested right to use the highways of the state for private enterprise to the detriment of the general public," says the opinion of the court commissioner. "Where the individual interest conflicts with the public interest, as must be the necessary result in the use of public highways for private purposes without regulation, the government is never impotent to protect the public welfare."



Hairpin Turn on the Road to Tripoli



New Mack Sales and Service Station at White Plains, N. Y.

Pointers on Garage Design from a Manufacturer

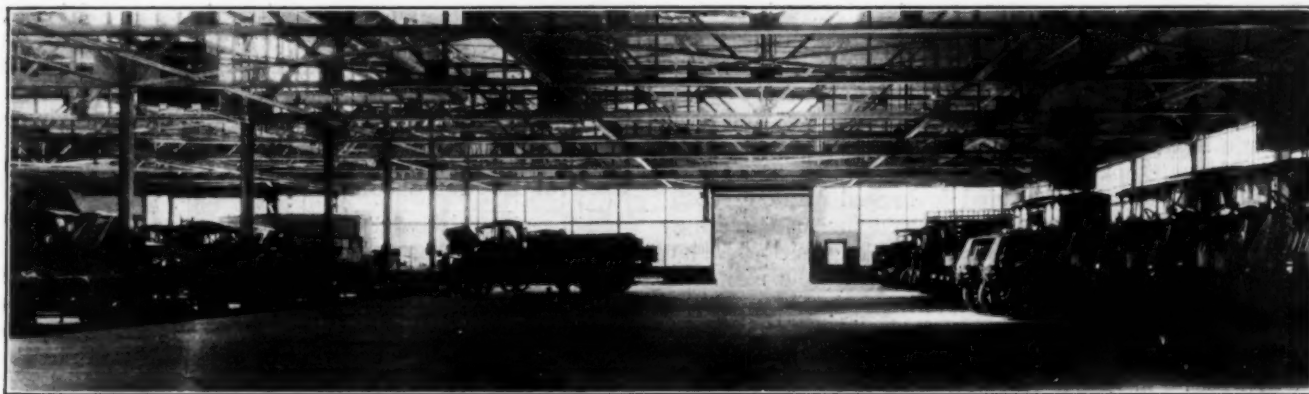
New service station of International Motors Company at White Plains, N. Y., represents latest type of repair shop construction

ONE of the largest, most modern and complete garage and repair shops which has been built recently and one from which the railroads, when their demand for large facilities of this type increases, can draw many valuable suggestions applicable to their own requirements, is that of the International Motor Company, manufacturers of Mack trucks and buses, at White Plains, N. Y. This plant is typical of the facilities which have been provided by that company at various points in recent years, and involves a number of important features adaptable to motor bus and truck garages and shops generally. While the plant at White Plains has been designed for both the sales and repair of Mack trucks and buses, the particular layout adopted separates almost completely these two distinct branches of activity.

As the railroads, as an operating concern, are more particularly interested in the shop facilities, this article will deal primarily with that end.

In general, the plant is a steel frame, brick wall structure, rectangular in shape, the front of which is occu-

pied by the sales and accounting departments, while the main part of the building is used for the storage and repair of trucks, these distinct branches being separated entirely by intermediate walls. To many, the shop unit of the building might appear of ordinary factory-type construction, but close study of its design and the layout of its facilities discloses the fact that many features have been incorporated which are particularly pertinent to the purpose for which the building was designed. The most important of these features include provision for adequate daylighting at the points where it is most essential; the arrangements for providing for both natural and forced ventilation to keep the building free from poisonous gases; the heating arrangement, which is designed to heat the shop either as a whole or to confine the heat to any particular portion of the shop; and the effective bi-level shop arrangement employed in one section of the main shop which provides open, light and well ventilated working wells, and which makes it possible for underframe and chassis work to be carried on with the utmost convenience and safety.



Looking Through One of the Two Large Bays of the Shop

The floor space within the shop is divided primarily into three principal units, an inspection room, a storekeeper's department, and the main repair room. The inspection room, which is approximately 88 ft. by 85 ft., is located adjacent to the front end of the main repair shop and connected to it by means of a large entrance-way fitted with sliding, tin-clad fire doors. This particular room, which is used for the initial inspection of all incoming trucks and buses and for final inspection of all trucks or buses leaving the shop, has two main side openings, both fitted with motor-operated rolling steel doors, one designated as an entrance and the other as an exit. Between these doorways is a small enclosed office for the shop manager and for inspectors.

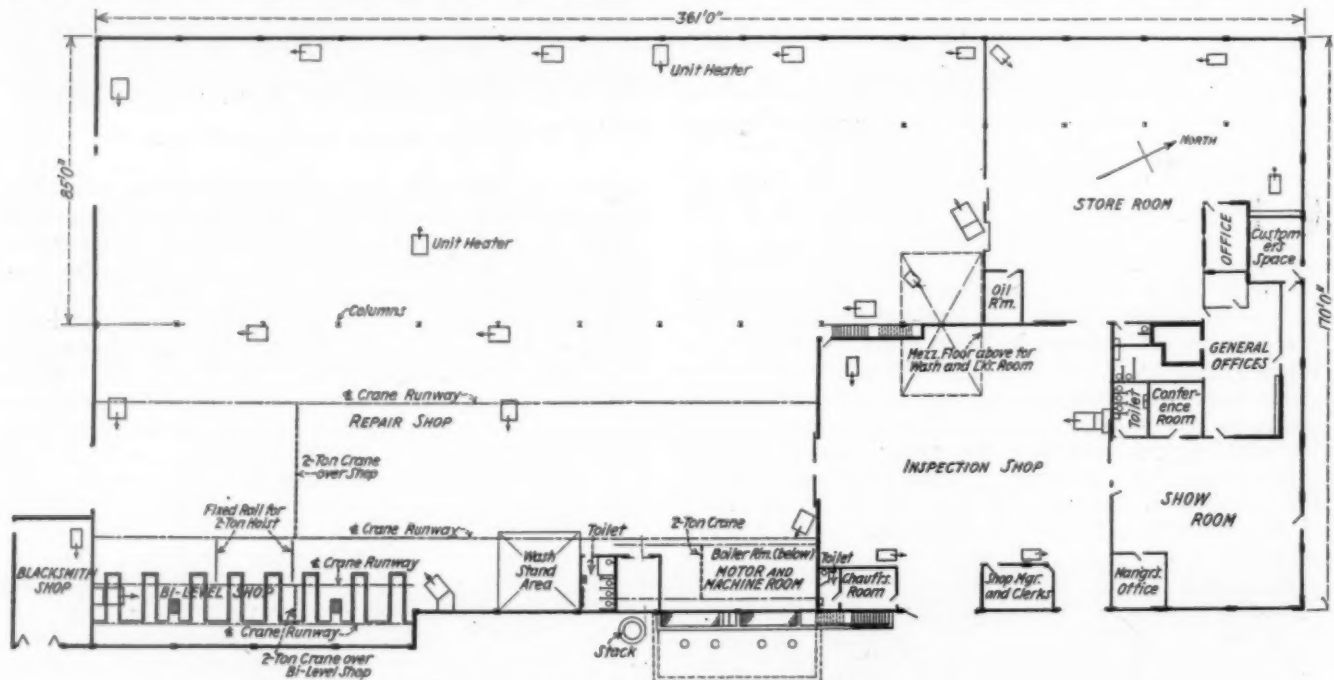
The storehouse unit of the shop lies almost directly opposite the inspection room at the same end of the main shop area, and here, space approximately 85 ft. by 65 ft. has been provided for the storage and disbursement of all bus and truck parts. This room has openings to both the sales department and the repair department, the main opening being into the shop where material and parts are given out on requisition.

Building Embodies Permanence of Construction

The main shop unit of the plant occupies the entire portion of the building directly back of the inspection

rear end wall faced with stucco, provided so that the shop can be extended readily should future requirements demand. A particular feature of the side wall construction is the large areas of fixed and center-hung steel sash which have been provided, glazed with hammered glass to admit a large amount of diffused daylight. The flooring throughout the entire shop area, including the inspection room and the storeroom, is of concrete, suitably drained through outlets at intervals down the center of each bay and at other special points. The roofing is made up of 3-in. tongue and groove fir, protected with four-ply built-up pitch and saturated felt roofing, and is supported on 85-ft. span Pratt trusses over each bay, spaced 24 ft. center to center.

Superimposed on the roof trusses, and centrally located over the center row of roof columns, is a roof monitor which is 42 ft. wide and which extends the full length of the shop. This monitor is 11 ft. high along the sides, which are fitted completely with fixed and center-hung steel sash glazed with hammered wire glass. The roof of the monitor is V-shaped, coming down to the level of the trusses at the center. Drainage of the monitor roof is to the center line of the building where water is carried below through drains extending down along the columns. The main portions of the shop roof on each side of the monitor slope gradually to the sides of the



Floor Plan of the White Plains Shop

room and storeroom. While this is slightly irregular in plan, it is primarily rectangular in shape, 361 ft. by 170 ft., and divided longitudinally into two main bays by a row of structural steel roof supporting columns. Each of these bays is 85 ft. wide, free from columns, and was so made because it has been found that this width provides adequate space for wall work benches, and for a row of buses or trucks headed or backed in along each side with sufficient aisle space between for maneuvering the longest buses or trucks into or out of position. The single exception to this width of bay is at the rear end of the shop on the east side, where the bay width, through a distance of 96 ft., has been made 95 ft. to provide additional space for the bi-level shop arrangement which will be described later.

Structurally, the shop unit is a steel frame structure with common brick side walls, and with a hollow tile

building. The only other openings in the roof beside those in the monitor are three rectangular skylights, 14 ft. by 16 ft., spaced 56 ft. apart down the center of each bay. Like the sash in the sides of the monitor, all of the skylights are glazed with hammered wire glass, giving a diffused light directly over the aisle space in each bay.

General Layout of Shop Is Simple Yet Effective

In the general layout of the facilities at the shop, the east bay has been arranged to take care of practically all of the repair work, while the west bay, except along the east side, is used at present primarily for the storage of buses and trucks. In the east bay, the space along the side wall toward the rear of the building is occupied by the bi-level shop for the heavy repair of equipment, and more particularly, for underframe, differential and transmission work. Just beyond this, along the east wall, is

a wash-stand area, 24 ft. by 24 ft., with suitable drainage, where buses and trucks can be washed and where special equipment has been provided for the cleaning of oily or dirty parts.

Another important unit in the east bay is the motor repair and machine room which is located at the front end of the shop along the east wall. This unit, which occupies a space approximately 48 ft. by 32 ft., is separated from the shop proper by steel wire caging, and, as its name implies, houses the special equipment and tools for the repair of motors and motor parts. Other segregated areas within the shop include a blacksmith shop, 24 ft. by 38 ft., in a separate unit adjoining the rear end of the building immediately back of the bi-level shop; a shopmen's toilet room, about 10 ft. by 16 ft., between the washstand area and the motor and machine room along the east side of the building; and a locker and wash room, approximately 22 ft. by 42 ft., which has been provided for shop employees on a mezzanine floor at the front end of the shop. Of these two latter facilities, the former is provided with toilets and wash basins for the convenience of employees during working hours, while the latter is equipped with individual steel lockers and two Bradley wash fountains in order to afford the men suitable facilities for changing their clothes, and for washing up at the end of the day.

Tool and work benches within the shop are provided at all points where repair work is carried on, and in all cases are so located as not to interfere with the movement of buses or trucks. In addition to those located along the wall in the bi-level shop and the motor and machine room, the main work benches are located along the central row of columns separating the two bays of the shop. In this location, two rows of benches are placed back to back, one bench facing and serving the

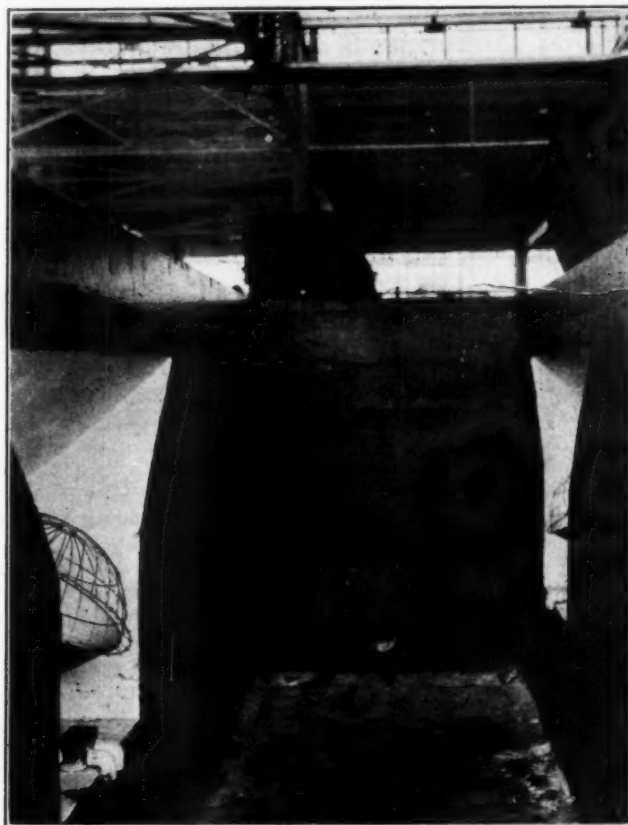


Looking Through Low Level of Bi-Level Shop

east bay, and the other facing and serving the west bay. Except for breaks at intervals in order to provide for the movement of buses and trucks from one bay to the other, these benches are continuous throughout the length of the shop.

At present no benches are provided along the outside wall of the west bay although ample room has been provided for their installation at a later date. All of the benches provided have steel underframes with sheet steel tool drawers at intervals, and have a heavy matched board top.

One of the important and effective features incorporated in the new Mack service station at White Plains is the bi-level shop, previously referred to, which was provided primarily to facilitate carrying on work beneath buses or trucks. As the name implies, this shop is of two-level construction, providing a trucking and working level above and a working level below. Briefly, it consists of a series of eight open-end working wells, 12 ft. long by 3 ft. 5 in. wide, at right angles to the side



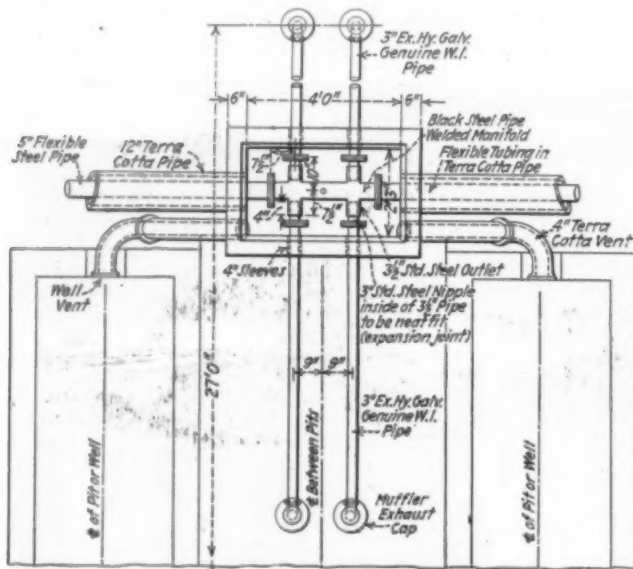
One of the Wells in the Bi-Level Shop, Showing Vent in End Wall and Special Lighting

of the building, and with a space of 6 ft. 10 in. between the wall and the open ends of the wells. The tops of the wells are at the main floor level while the bottoms of the wells and the space between their open ends and the side wall of the building, are at an elevation 5 ft. below the main floor level, making it possible for work to be carried on both on top of and beneath buses or trucks at the same time. With such an arrangement, it is evident that while a truck stands over a well there is an unobstructed open working space directly beneath it and a shop floor directly behind it, five feet below the truck level.

In the plan the wells are spaced 11 ft. 3 in. center to center, except wells 2 and 3, and 6 and 7, numbered from the end of the building, which have been spaced 14 ft. 3 in. center to center in order to provide for 3-ft. stairways between the two levels. In order to prevent raveling of the concrete along the top of the wells, and more particularly to prevent trucks or buses from being run into the wells, the top edges of all of the wells are fitted with $\frac{1}{2}$ -in. steel angle guards along each side, projecting 3 in. above the floor level and joined together in a point 4 ft. 6 in. ahead of the end of each well.

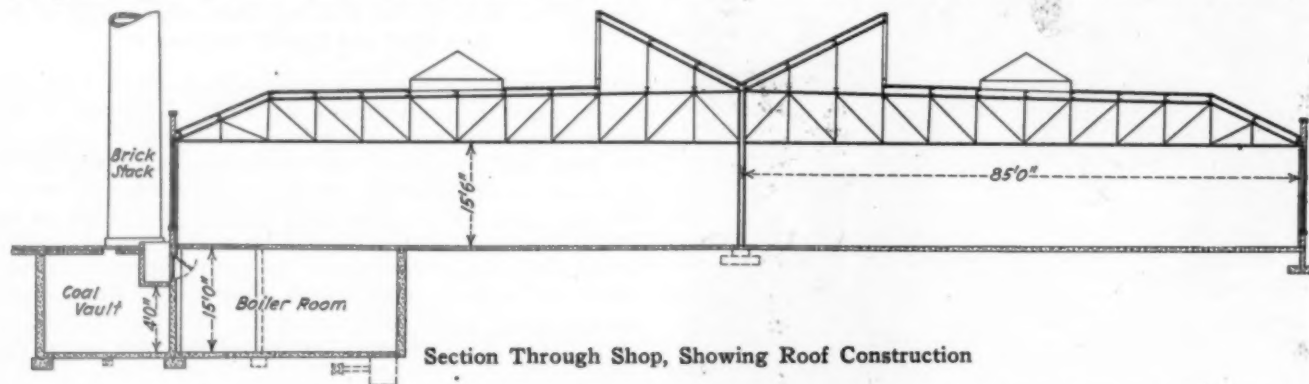
To the rear of the wells the main floor is raised on a curve, 9 in. above the general floor level, and is cantilevered out about 2 ft. 3 in. over the working space below. This is to provide additional working space be-

hind the wells above and below, and also to serve as a bumper or high curb to prevent trucks or buses from being run accidentally into the lower level. As a further precaution in this respect, but more particularly to safeguard employees, the outside edge of the cantilevered floor at the rear of the pits is fitted with a heavy



Details of Piping Arrangement in Special Ventilating System for Bi-Level Shop

pipe railing consisting of two rows of 1½-in. steel pipe in 6-in. I-beam posts. Along the top of this railing a narrow tool tray is provided for the convenience of mechanics, this being fitted with a vertical strip along its outside edge so as to preclude the possibility of tools or parts being pushed off into the area below. Directly behind each well the railing is arranged in 8 ft. 6 in. sections which are removable so that if the necessity arises they can be taken down while large or heavy parts are being handled from the wells to the shop area below.



Section Through Shop, Showing Roof Construction

Railings are also provided along the sides of each stair well; in these instances however, they are made up entirely of pipe and have no tool trays. As it is essential to provide for free movement over the wells behind the trucks, removable steel gratings span the well openings at the rear ends, making a continuous walkway throughout the length of the cantilevered floor projection.

In the shop level behind the wells, a continuous space, 96 ft. long by 6 ft. 10 in. wide, is provided which is on the level of the floor of the wells and directly connected with them. Most of the repair to parts is accomplished within this area, the wall space being fitted throughout its length with a work bench which is served at intervals by compressed air, water, and by electricity for both power and light, in addition to a welding circuit.

The special advantages of the bi-level shop, as constructed at White Plains, appear to be many. First, it permits work to be done on a bus or truck from above and below at the same time; it provides direct access to the wells from a low level and therefore permits ready escape for mechanics if fire should occur; through its open end construction, facing the sash in the side wall of the building, it affords maximum daylighting within the wells and under standing buses or trucks; and through the same feature of construction, it affords maximum ventilation of the wells in that the end openings permit the constant inflow of fresh air from the side wall windows and from the special ventilator gratings provided in the side wall directly in front of each well above the work bench.

Bi-Level Shop Free From Poisonous Gases

While all of these advantages are important, the last mentioned is, no doubt, the main consideration, as it is well known that the deadly carbon monoxide gas from gasoline motors is heavier than air and seeks all low levels. However, the open end well construction is not relied upon alone for removing the gas, and forced ventilation is resorted to. In the ventilating arrangement provided, both the direct gases from running motors over the wells and the accumulating gases in the wells themselves and in the low level shop, are drawn off through an arrangement of openings and ducts which are connected directly to two exhaust fans. For ventilating the wells themselves, the closed end wall in each well is provided with a 3-in. opening near the floor, through which the gases are drawn when the connected exhaust fan is in operation. The result is that under the most severe conditions of atmosphere, ideal ventilation is afforded in the wells as fresh air passes through their open ends and all foul air is drawn off near the floor in the opposite ends.

For carrying off the direct exhaust from running motors located over the wells, a special ventilating system has been installed whereby the exhaust pipe of a motor can be connected directly to exhaust holes in the main

floor level by means of flexible tubing, and the hot gases drawn off through a sub-level duct.

The two exhaust fans in connection with the ventilation system are located at the north end of the bi-level shop and are connected directly with the open air through the side wall. For exhausting air from the bi-level shop and the wells, a blower of 1140 r.p.m. is used, while for carrying off engine exhaust, a smaller fan, but with a speed of 1720 r.p.m., is used to give a stronger suction. Each of these fans is operated by a one horse power electric motor.

Unit Heaters in Main Shop

Of no less importance than the ventilating system provided for the bi-level shop where the greatest quan-

tities of gases are most likely to occur, is the ventilation of the shop building as a whole, which might easily become flooded with poisonous gases if special precautions were not taken. In the system adopted at White Plains, ventilation in the main shop is taken care of both naturally through the arrangement of doors and windows, and artificially through the system of hot air unit heaters, carefully arranged so as to assist ventilation during the winter when the doors and windows are most likely to be closed.

Depending upon the direction of the wind, sash in either side of the building and in either side of the roof monitor can be opened so as to produce a continuous flow of fresh air toward the center of the building and then upward toward the monitor. This, of course, is supplemented by the fresh air which is admitted through the doorways in the ends of the shop when the doors are open.

In the heating system adopted for the shop unit, which is designed to provide forced ventilation as well as heat, 27 unit heaters of the Areofin type have been installed at suitable points about the shop, just above the lower chords of the roof trusses. These heaters, some of which are connected directly with fresh air ducts, are each fitted with a down deflector at their outlet end so as to force the heat to the floor level, and are so adjusted into position as to provide for the uniform flow of hot air in definite lanes throughout the building. These heaters, depending upon their locations, have various ratings ranging from about 200,000 B.T.U. per hour to about 480,000 B.T.U. per hour.

All of the unit heaters are supplied with steam through an overhead system of insulated steam lines and have returns which extend either in a covered pipe trench adjacent to the central row of columns, or along the side walls. In placing the returns along the side walls, care was taken to keep them as high as possible above the floor so as to facilitate cleaning under them.

The general principle in placing each heater in the shop is best illustrated by the arrangement of the heaters in the inspection room. Here one of the heaters has a fresh air duct through the roof, and each heater is so placed that there will be a tendency for the heated air to move in a circle around the room and out the two door openings. In the shop proper the main principles governing the position of the heaters were: To provide for fresh air ducts to some; to face the heaters so as to drive the air in definite lanes throughout the building; and furthermore, to place heaters to blow across each entrance so as to counteract incoming cold air if the draft should come from that direction.

In order to insure heat and ventilation over the work benches through the center of the building three heaters have been installed above the benches and blowing directly over them toward the rear doors. A heater has also been installed at the south end of the bi-level shop, forcing hot air directly into it and thereby improving ventilation conditions at that point.

While all of these heaters are provided primarily to warm the building during the winter it is important to note that they are well adapted for use during the summer or fall without heat to assist the natural ventilation provided through the window openings. Each of the blowers in the heaters is controlled by a separate switch so that all of the heaters or any part of them can be put in operation at one time, thereby making it unnecessary to operate the entire battery of heaters if it should be desired to ventilate or heat only a certain section of the shop. Likewise steam can be cut from any of the heaters if desired, thereby reducing the steam consumption.

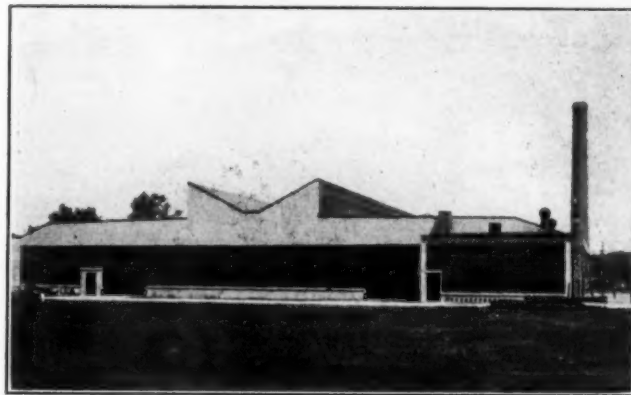
Steam for the heating system is provided in a boiler

room in the basement of the shop, directly beneath the motor and machine room. Here, two fire box type boilers have been provided, one of 250 hp. capacity and the other of 100 hp. capacity. These boilers are each equipped with a blower operated by a 3 hp. motor, and are equipped with pin hole grates for the burning of coal yard sweepings. The blowers in connection with the boilers are so connected with the boilers by means of ducts that either blower may serve either one or both boilers. These blowers are electrically operated and are so controlled that they cut in automatically when the steam pressure is down to two pounds, and cut out automatically when the steam pressure reaches five pounds. The smoke stack in connection with the boiler room equipment is of brick construction, and is 95 ft. high.

Heating System Employed

Offers Special Advantages

There are a number of reasons why the heating system as installed was adopted, and furthermore, why this system is particularly adapted to bus and truck shop heating. In the first place it combines forced ventila-



Rear View of Shop Showing Extensive Areas of Sash in Monitor and End Wall

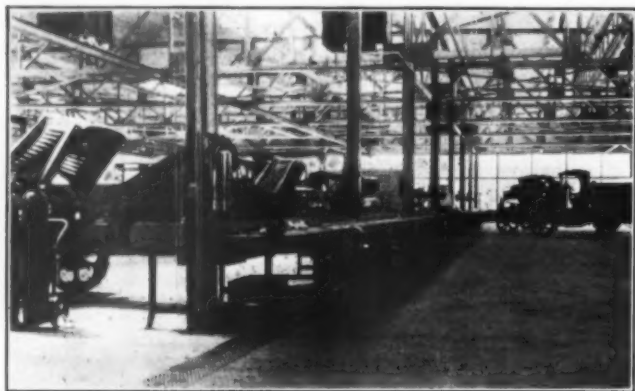
tion with heating which is highly desirable where poisonous gases are likely to accumulate; it provides for sectional heating and ventilation if desired; and it arranges for the influx of fresh air rather than the re-circulation alone of foul air. The installation of the unit heaters above the floor, and equipped with down deflectors, also affords many advantages in garage heating. Among these are the fact that it leaves the floor space unobstructed; it forces the hot air downward toward the floor where it should be; and of no less importance, it precludes the possibility of a hot blast being blown directly upon shop employees or upon buses or trucks near the heaters. It also makes it possible to confine all piping to the roof structure, and thereby affording maximum unobstructed floor space.

Both Natural and Artificial Lighting Are Provided

Another feature in the shop construction at White Plains is the natural and artificial lighting provided, which has proved so effective that trailer lights are seldom necessary for carrying on any class of work except at night or on exceptionally dark days. Through the arrangement of extensive areas of sash in the side walls and in the roof monitor, daylighting is afforded at the points where it is most desired, that is, at the benches along the side walls, at the bi-level shop, and at the benches provided along both sides of the row of columns through the center of the shop. To secure lighting in this latter location was the governing factor in the adop-

tion of the special roof monitor extending throughout the center of the building, this arrangement throwing light from two directions directly over the benches and the area each side of them where repair work is carried on. To further improve daylighting within the building, the entire underface of the roof was painted white, and six large skylights were installed over the center of the two shop bays.

In the general system of artificial lighting employed, drop lights with shallow bowl reflectors are suspended from the roof at uniform intervals throughout the entire shop. These are supplemented by a series of low-hung drop lights with suitable reflectors at about eight-foot intervals along the work bench in the bi-level shop and by a large number of receptacles for extension lines to be used when necessary in carrying on the shop work.



Work Benches Through Middle of Building Are Well Lighted from Roof Monitor

In each of the wells of the bi-level shop special artificial lighting has been arranged for through the installation of two electric floodlights installed in recesses in the side walls. These recesses are painted white and are so shaped as to direct the light upon the bottom of trucks or buses located over the wells. One of these recesses is located toward the rear of the well while the other is toward the open end so that uniform lighting is afforded throughout. The floodlights used consist essentially of 125-watt lamps in specially shaped reflectors, the faces of which are protected by means of wire caging.

Special Equipment Forms

Important Part of Shop Facilities

For carrying on the work effectively within the shop a considerable number of special facilities and shop tools were installed. These include the provision of compressed air, water and power circuits along all of the benches; hoisting equipment in the east bay for handling heavy parts or truck and bus bodies; a gasoline filling station at the entrance of the inspection room; and a considerable number of special tools and equipment in the motor and machine room.

The hoisting equipment at the shop consists principally of an overhead traveling crane of five tons' capacity, spanning the central portion of the east bay and arranged for serving the full length of the shop and the motor and machine room; a traveling type crane of short span extending over and serving the entire length of the bi-level shop; and a small capacity portable jib crane for handling parts at various points where needed. Both of the traveling type cranes are hand-operated through a chain and sprocket arrangement and carry hand-operated tackle blocks of two tons' capacity each.

For carrying on the repair work in the motor and ma-

chine room, the principal equipment provided consists of a quick-change motor-driven lathe with an 18-in. swing and 10-ft. bed; a brake lining machine; a large power drill; a high speed power drill; a power hack saw; a power press of 60 tons' capacity; a valve refacing grinder; two revolving motor stands; and a number of other special tools for boring connecting rod, motor, and cam shaft bearings.

Another unit of equipment installed in the shop is that for cleaning dirty truck and engine parts. This is located over the washstand area along the east wall and consists of two principal units whereby the parts to be cleaned can be treated with a special oakite solution. One of these units is a large iron tub, suitably heated by live steam, into which parts can be immersed, while the other unit consists of a small metal tank container directly connected with a special spray gun for spraying the solution on parts too large to be dipped. The heating unit in connection with this cleaning equipment is a small gas heater installed about 15 ft. from the cleaning equipment, on the opposite side of the shopmen's toilet along the east wall.

Fire Protection Was Important

Consideration in Shop Design

In a building of this character it is evident that fire protection is of large importance. This was recognized in the type of construction employed at White Plains, which is fireproof throughout with the exception of the roofing of matched boards. This particular roofing was adopted owing to its lower initial cost, and furthermore, because of the fact that in the particular location of the White Plains shop, insurance rates made the frame roof covering advantageous. Overcoming any disadvantages of this type of roof, however, is the fact that the entire shop is equipped with an automatic sprinkler system, which in any event is essential to protect buses and trucks within the shop if fire should occur. Supplementing the sprinkler system in the fire protection afforded the shop is the provision of water hydrants around the exterior of the building, the provision of fire line outlets and sections of hose at intervals within the shop; the installation of a large number of chemical extinguishers at various points along the side walls and row of columns; and the further provision of about 50 fire pails filled with sand and placed uniformly throughout the shop.

Personnel

In the operation of the shop at White Plains the force employed consists of a service manager, one foreman in charge of all repair work, three inspectors for making initial, intermediate and final inspections of all work, one machinist, three motor mechanics, and 22 general mechanics. With this force the service station has a repair capacity at present for about 50 trucks and buses at one time, in addition to space for the storage of about 30 more.

All of the design, architectural and construction work in connection with the service station was handled by E. E. Seelye & Co., consulting engineers, New York, under the direct supervision of H. C. Lamb, while all of the mechanical work in connection with the station, including plumbing, heating, ventilating, and electrical work, and the installation of the sprinkler system, was designed and laid out by E. H. Faile, consulting engineer, New York. The actual construction of the building itself was done by the Turner Construction Company, New York, while the special equipment and facilities within the building were installed by a number of contracting concerns.

Railway Bus Fares Not Uniform

*Rates range from two and one-quarter to five cents per mile
—Low levels influenced by competition*



A. B. & M. Bus at Bretton Woods, N. H.

THE basic rate of 3.6 cents per mile charged for the transportation of passengers on railway trains is also the basic rate for transportation on a large portion of the buses operated by steam railways. On the other hand there is no general uniformity in the rates charged by all the railway bus lines since a substantial number of them have fixed their rates at various levels, ranging from $2\frac{1}{4}$ to 5 cents per mile.

The standard rate of 3.6 cents per mile is in effect on the New England Transportation Company, the Boston & Maine Transportation Company, the Jersey Central Transportation Company, the Union Pacific Stages, the N. C. & St. L. Motor Transit Company and the Rutland Transportation Company. The Denver & Rio Grande Western, in the case of its subsidiary, the Denver-Colorado Springs-Pueblo Motor Way, has a revenue per passenger mile of approximately 3.6 cents, but on its bus line in western Colorado, the Western Slope Motor Way, it has a revenue per passenger mile of a little over 5 cents.

From $2\frac{1}{4}$ to 5 Cents

The SamOset Company which operates the bus lines of the Maine Central has a rate of 5 cents per mile. The basic fare of the Northland Transportation Company is $2\frac{3}{4}$ cents per mile on routes where the buses traverse paved roads and 3 cents per mile on lines operating over dirt roads. On the Norfolk Southern the basic rate is $2\frac{1}{4}$ cents per mile, while on the Denver & Interurban it is $3\frac{1}{2}$ cents per mile. The Canadian Pacific Transport Company operates buses over a 4.5 mile route between Galt, Ont., and Preston and has a one way rate of 10 cents.

In the case of the Rutland the rate was fixed at 3.6 cents a mile because the bus service was a substitute for train service. It was thought that strenuous objection would be raised against a higher rate of fare for the bus than applied in the case of the railroad, especially in view of the fact that the Rutland was permitted to abandon train operation. A similar situation applied in the case of the N. C. & St. L. which, in its application

to the public utilities commission for a permit to operate bus service and to abandon passenger train service on its Tracy City branch, promised the same service and rates of fare as applied on the trains.

Northland Fares Below Rail Rates

Discussing the reason for the $2\frac{3}{4}$ -3 cent rates of the Northland Transportation Company, C. E. Wickham, president, states, "When the Northland Transportation Company took over several bus companies in the state of Minnesota there were a great many different rates of fare. We endeavored to make the fares as low as possible and still earn a reasonable return on our investment. We therefore decided on the above mentioned rates which are in effect on practically all lines."

L. B. Wickersham, general manager of the Norfolk Southern Bus Corporation, feels that the $2\frac{1}{2}$ cents per mile rate of his company is too low. "We are of the opinion that it should be 3 cents per mile," says Mr. Wickersham. "However, this is a matter that is governed by independent competitors who are operating on this basis, and until the rate structure in the territory is stabilized, we cannot vary from prevailing rates and handle the business."

Competition a Factor

Explaining the $3\frac{1}{2}$ -cent rate fixed by the Denver & Interurban Motor Company, W. H. Edmunds, general manager, says, "The one way and round trip ticket rates were made by adopting the rate schedule of the Denver & Interurban Railway Company, which service the motor company succeeded. Commutation rates and special car rates were made with the idea of inducing the public to ride and in an endeavor to create a more steady riding habit."

It is realized that the motor coach operation is competitive with the keenest competition in the world, the private automobile, and that every casual rider who can be secured and converted into a regular patron is a decided asset to the company. The rates chosen are very reasonable considering the density of the population in this district and seem to be very satisfactory."

Some Roads Offer Special Rates

The Rutland offers no special rates for regular service except that all railroad tickets, including school commutation tickets, which are sold at a rate of approximately 1.1 cents per mile, are honored for traffic on the buses. Special chartered bus service is provided at a rate of 50 cents per mile, using round trip highway mileage, plus 30 cents per mile for any deadhead mileage operated. The minimum charge per trip is \$30, including four hours of waiting time. If more than four hours is consumed in waiting, an additional charge of \$4 per hour or fraction thereof is assessed.

The Denver & Interurban sells round trip tickets at a 10 per cent reduction of the two-way fare, with a 15 day limit. Twenty-five ride commutation books, good for the bearer and members of his family, are issued at a 20 per cent reduction. The special chartered bus rate for 20 passenger coaches is 50 cents per mile; for 30 passenger coaches, 60 cents per mile. The deadhead

mileage rate is one-half of these rates. Special excursion rates are given under varying local conditions.

The Northland offers round trip rates between the Twin Cities and Duluth from points where the distance is 100 miles or more. It also has a special week end round trip rate of \$2 under the regular 30 day round trip rate which applies between Duluth and the Twin Cities. There is also a special round trip rate from the Twin Cities to Port Arthur when the boat trip to Isle Royal is made.

The SamOset Company offers no special rates except for chartered buses, for which a charge of 50 cents per mile is made, the minimum charge being \$25.

Effect of Rates of Competitors

Several railways, such as the Norfolk Southern mentioned above, have had to govern their rates in accordance with competitive conditions. A notable example of this is the case of the Canadian Pacific Transport Company. In regard to the situation faced by this line, C. J. Whitney, general passenger agent, says:

"The Canadian Pacific Transport Company buses operate between Preston and Galt, a distance of 4.5 miles. For years the Grand River Railway provided a half-hourly service between these points. The equipment was most modern and up-to-date, and the service first class in every respect, and more than ample for the needs of the traveling public between these points. The railway charged a fare of 10 cents in each direction and provided commutation tickets, 50 tickets per book, for \$2.90.

"A few years ago, independent bus operators inaugurated a service between Galt and Preston, and for a time the railway, feeling that its service and equipment were superior to that provided by the independent bus operators, made no move to combat the new competition. However, it developed that, while the independent bus operators' equipment and service did not equal that provided by the railway, except that the buses made stops anywhere along the route, the public preferred to travel in motor buses, so that about two years ago, the railway established a bus service between these points, the operating company being known as the Canadian Pacific Transport Company.

Recovering Lost Traffic

"The independent bus operator met the railway's regular fare and also provided commutation tickets at a rate of 12 rides for 70 cents. When we commenced operating buses, we were forced to meet these fares, which still prevail on the three lines operating between Galt and Preston. The net result has been that the railway has been able, through its bus operation, to recover largely the traffic which left its rail operations for the competing bus lines."

The SamOset Company has no bus lines regularly in competition with it and neither has the Rutland, but the latter states that the rates of independent bus lines operating in its territory are generally higher than the railway rates and therefore higher than the Rutland bus rate. The rates of fare charged by the independent bus lines in Rutland territory range upward from 4 cents per mile.

"We have no licensed competitors operating over the road covered by our certificate out of Denver," says W. H. Edmunds of the Denver & Interurban. "The other regular lines radiating out of the main terminal have rates based on the standard railway fare of 3.6 cents per mile."

The Northland has only one competitor whose rates are the same as those which it charges.

The Sullivan Vaporizer for Gasoline Engines

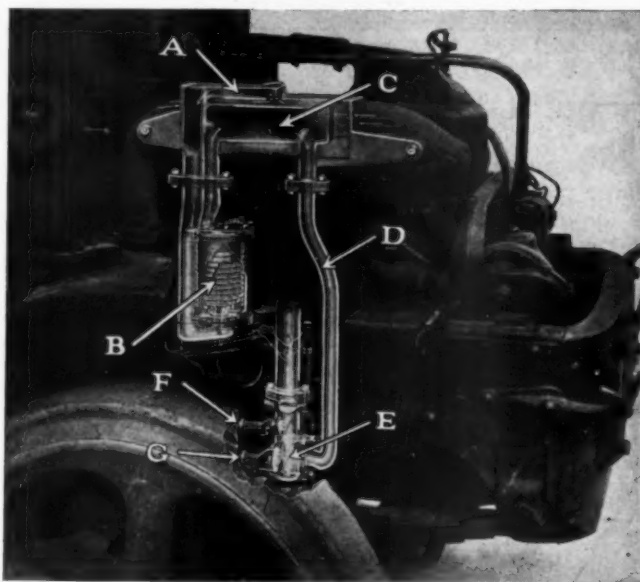
A VAPORIZER that feeds a "dry" vaporized gas to the cylinders of a gasoline engine has been placed on the market by the Sullivan Vaporizer Corporation, 37 31st street, Long Island City, N. Y. In operation the air enters the air heating chamber *A* where it is heated and drawn downward, entering the vaporizer *B*.

The velocity of the air passing the jets draws the gasoline upward from the jet, spraying it through a series of eleven perforated baffle plates.

These baffle plates, which are scientifically arranged and staggered, break up the gasoline and air in its passage, and permit only a fine vaporized gas to pass upward into the vapor superheating chamber *C*.

The heavy drops of the gasoline, being unable to pass the baffle plates in the vaporizer *B* are dropped into a trap at the base of the vaporizer, from which their only escape is by vaporization up through the baffle plates.

After the vaporized gas leaves the vaporizer proper and enters the vapor superheating chamber *C* it is drawn downward through the vapor passage *D* into the control



The Sullivan Vaporizer

E which is equipped with a low speed cold air valve *F* and a high speed cold air valve *G*. In this control, the air to fuel ratio is obtained, which is materially greater in air ratio than it is possible to use with any other existing method of carburetion.

Regulating Air Intake

At low engine speeds, the low speed cold air valve admits the required volume of cold air, while at a predetermined increase in engine speed, the high speed cold air valve functions to admit the required greater volume of cold air.

These valves are adjusted at the time of installation, and sealed in position.

Passage of the vaporized gas through the control is regulated by a butterfly valve operated by the accelerator.

Vaporized gas passes the butterfly valve into the manifold and thence to the cylinders, furnishing an absolutely "dry" vapor of gas to the combustion chamber.



Unloading a Freightainer from Truck to Platform

“Freightainers” on B. & M. Furnish Door-to-Door Service

New facility operated over Boston & Maine between Boston, Worcester and Springfield improves service

“FREIGHTAINER” service is a new transportation facility which provides for the movement of l.c.l. freight without re-handling from the door of the shipper to the door of the consignee. The first operation of Freightainers has been that of the Freight Container Service Company, Boston, Mass., which has operated over the rails of the Boston & Maine between Boston, Mass., Worcester and Springfield, for about a year. The movement of l.c.l. freight in these containers on this line is now averaging about 125 tons daily.

The mechanics of the plan of Freightainer operation are simple. Empty steel containers capable of carrying up to five tons each are brought to the shipper's door by motor truck. Here they may be loaded like any other truck or the Freightainer may be rolled off the truck chassis and on its own casters to any part of the shipper's building, to be loaded, locked and sealed. Again placed on a motor truck, the loaded Freightainers are taken to the railroad freight station, where they are rolled off the truck and onto the freighthouse platform and from the platform onto a flat car routed to the destination city. At destination the loaded Freightainers are taken from the car by motor truck directly to the door of the consignee where they may be unloaded without being removed from the truck or the Freightainers may be rolled to any part of the consignee's building for unloading.

Designed to Replace Inter-City Motor Trucks

The Freightainer service is primarily designed to handle the class of freight which is now being largely han-

dled by so-called inter-city or long distance motor trucks. One effect of the operation of Freightainers by the Boston & Maine has been to increase the earnings of the cars used in the Freightainer service. Under the Freightainer operation, these cars move 300 days in the



The Flat Cars Are Fitted with Tracks and Latches

year, and their average lading is several times that of the ordinary l.c.l. box cars.

Characteristics of Freightainers

The Freightainer is designed primarily to provide a unit container of such mechanical design that it can be quickly and easily transferred between trucks and railroads and can readily be rolled about on platforms or

floors in the smallest possible space and with the least effort. The containers used by the Freight Container Service Company are manufactured by the Perin-Walsh Company, Boston, Mass., and bear the registered trademark name of "Freightainer" and are equipped with "Roloff" attachments.

The dimensions of the Freightainers are: Length, 8 ft.; outside width, 7 ft.; inside height, 6 ft. This size



Two-Ton Trucks Handle One Freightainer

permits the carriage of an average load of $3\frac{1}{2}$ tons, but the Freightainers are frequently loaded with 5 or 6 tons if the merchandise is heavy, such as canned goods or castings.

The body part of the Freightainer is of wood and steel construction. Double sliding doors are provided at both ends so that when two Freightainers are on a mo-

from either the inside or the outside of the Freightainers.

The running gear of each Freightainer consists of four specially designed locking swivel casters mounted on a special frame which carries locking devices for locking the Freightainer onto a flat car or a motor truck chassis. The body of the Freightainer is rigidly bolted to this frame. The casters may be either locked or left to swing free. This is necessary because, in order to guide the Freightainer and steer it into any desired position on a platform or warehouse floor, it is necessary that the two wheels opposite to the end from which it is being pushed or pulled be rigidly locked against swiveling and parallel to the sides of the Freightainer; and the two casters adjacent to the side from which it is being pushed or pulled must swivel freely. Otherwise, if all four casters were swiveling freely, the container would have a tendency to roll over the platform uncontrolled. In the design of the casters it was felt that best results could not be accomplished by having permanently rigid wheels at one end and ordinary swivel casters at the other end because in narrow freighthouses or congested warehouse floors it is frequently necessary to be able to guide the Freightainer from different ends at different times. In addition to this, it is necessary, whenever the Freightainer is on a motor truck or flat car, to lock all of the wheels rigidly against swiveling to prevent loose movement of the container body while it is in transit.

These results are accomplished by the patented locking swivel casters which not only automatically lock in the desired position but are also so designed, with six sets of Timken roller bearings and double-wheel dif-



Boston & Maine Flat Cars Loaded with Freightainers

tor truck, one behind the other, the rear Freightainer may be unloaded and, by opening the adjacent doors of both containers, the front Freightainer may be unloaded through the rear one. The doors are hung on ball-bearing Richards-Wilcox elevator door hangers. When closed, they are locked by a special flush type lock which draws them firmly together, and interlocking angle irons make them weather-proof. The locks may be operated

ferential action, that the container rolls about very easily on the platform under even five-ton loads.

Special Locking Equipment

The Freightainer is equipped with locking devices to hold it on motor trucks and flat cars. These are so designed that in loading on a motor truck the front container can pass through the locks on the chassis that

hold the rear container. In the case of flat cars, the container may be rolled onto the car from either side and automatically be prevented from rolling off on the other side. When loaded on flat cars the Freightainer

shoe store, may save as much as \$50 in wooden packing boxes and from 4 to 14 handlings of shoes. Pilferage and other loss and damage are avoided and the shipment is expedited.



Five-Ton G. M. C. Truck with Two Freightainers

doors are parallel to the sides of the car so that they may be unloaded from either side.

Several different makes and sizes of truck chassis are employed in this service, handling the same size standard "Freightainers." This is made possible by equipping each truck with a standard "Rolloff" sub-frame and leveling block. The sub-frame carries channel tracks of standard gage to fit the Freightainer wheels and locks to fit the Freightainer locks and may be mounted on any chassis, regardless of the width of the frame.

The leveling blocks consist of a pair of wedges mounted on the freight platform and a pair of V's mounted on the rear of the chassis. When a truck backs into these wedges, the chassis is automatically lifted or lowered until the track on the sub-frame is exactly level with the platform, regardless of whether the truck is loaded or empty. No tracks are used on the platforms but flared angle guides steer the Freightainer into proper position at the wedge blocks for rolling onto a chassis. At shippers' platforms where no wedges are installed, hinged skids are slipped into sockets at the ends of the sub-frame tracks, and automatically take care of any variation in chassis height.

Advantages of Freightainer Operation

A number of advantages in the Freightainer operation have been proved during their operation on the Boston & Maine. It has been found cheaper than ordinary l.c.l. freight service because of the elimination of re-handling and the reduction of loss and damage claims. It has also been found cheaper than ordinary road trucking because the line haul on the railway costs per ton only a small part of the truck cost per ton and the terminal pick-up and delivery is also cheaper because the chassis is not kept waiting for loading or unloading.

Service has also been expedited through the operation of the Freightainer since sorting, re-handling and transfer delays are entirely eliminated. With an overnight schedule of delivery on the railway, Freightainers may be loaded by shippers late in the evening and delivered to consignees' doors early the following morning. Safety is provided since the freight travels all the way in locked and sealed waterproof steel containers. The Freightainer also extends the convenience and freedom from packing expense of the ordinary inter-city truck.

As an instance of the saving made in the cost of loading, it has been found that a single Freightainer load of shoes, where the shoes are loaded at the end of the production line in the factory and unloaded at the retail

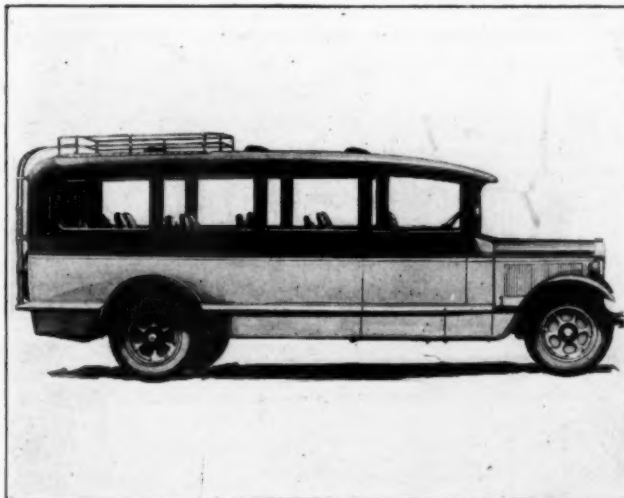
Three Models of Six-Cylinder Motor Coaches

GRAHAM BROTHERS, a division of Dodge Brothers, Inc., Detroit, Mich., has placed on the market a new line of six-cylinder motor coaches that are designed to give higher speeds and generally improved performance. The new features include a redesigned six-cylinder engine, four-wheel Lockheed hydraulic brakes, four-speed transmission and ball-bearing cam and lever steering mechanism. Improved riding comfort has been obtained by a better distribution of weight by the adoption of three stage progressive type rear spring construction and by changes in seat design.

The six-cylinder coaches take the place of the four-cylinder motor coaches formerly built by this company. The new coaches are built in street car type, the 16-passenger de-luxe parlor type and the de-luxe club type seating 12 passengers.

The high speed and fast acceleration available from the six-cylinder power plant is rendered safe by heavy-duty four-wheel Lockheed hydraulic brakes that have the inherent advantage of automatic equalization, which largely eliminates the necessity of making the mechanical adjustment provided for each individual brake and also does away with the use of the brake rods and other moving parts requiring attention and frequent lubrication. The large and positive brake on the drive shaft operated with a hand lever is entirely separate from the service brake system.

A large proportion of the body weight is carried over

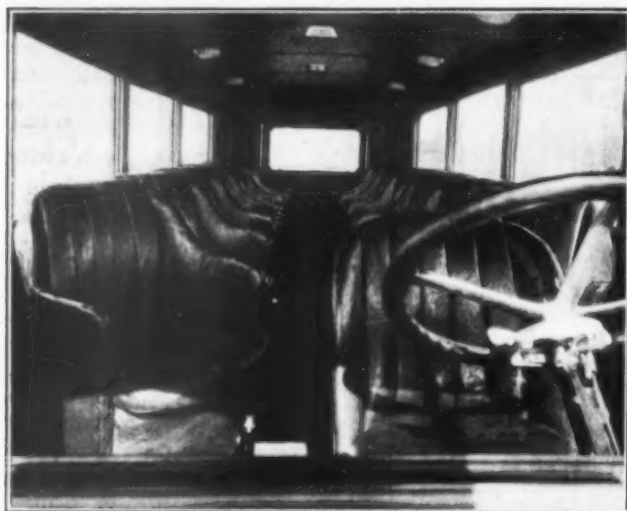


The 16-Passenger De Luxe Parlor Coach

the front axle resulting in a relatively short wheelbase, and the body location on the chassis is such that rear overhang is reduced to a minimum. The 162 in. wheelbase allows for easy handling.

The L-head type engine, with a bore of $3\frac{1}{4}$ in. and a stroke of $4\frac{1}{2}$ in. is accessible in design. The crankshaft, drop forged from alloy steel, has seven main bearings—a total main bearing length of 11 in. and weighs

69 lb. It is machined all over and is in static and dynamic balance. The connecting rods are forged from chrome-vanadium steel and the pistons are of light alloy fitted with Invar metal struts having a much lower expansion coefficient than the piston alloy, thus providing the same expansion for the piston as that of the cylinder and in addition strengthening the piston. The camshaft, drop forged from alloy steel, has four bearings with diameters from 2 in. to $2\frac{3}{8}$ in. The lubrication is forced feed to all main bearings by a gear pump



Interior of the 12-Passenger Club Coach

fitted with a strainer. The system also includes an oil filter and a siphon arrangement which provides against stoppage of oil if the strainer should become clogged.

A large hot-spot manifold and unique combustion chamber is designed for fast acceleration, and at the same time for economical use of fuel. An air cleaner prevents dust from entering the cylinders through the carburetor and gasoline filter obviates trouble from sedi-



The Graham Brothers 21-Passenger Street Car Type

ment in the fuel. Automatic spark advance is provided to secure better engine efficiency.

All the coaches are equipped with generators of 225 watts capacity with a voltage regulator and 215 ampere-hour storage batteries so as to provide sufficient current for the extensive lighting systems.

The rear springs are of the three-stage progressive

type, resulting in easy riding whether the coach is loaded to capacity or only partially filled. Riding comfort is further secured by the use of deep cushioned seats covered with leather. The 12-passenger club coach has seats of the individual chair type, with overstuffed air cushions and deep springs, set diagonally to the body sides. The 16-passenger parlor coach provides four double seats along the left side of the body and four single seats to the right of the aisle, while a section of four individual seats extends across the coach at the rear. One of the latter is quickly removable to provide passage through the emergency rear door. The seats are constructed of tubular steel with hardwood bases, the whole being covered with fibre wicker and a detachable leather slip cover. Air-filled spring cushions are provided with coil spring units as a base. The seats in the street car type motor coach are likewise upholstered in leather with deep spring cushions and spring backs. Exhaust heaters are provided in all models while the parlor coach and club coach are each equipped with an electric fan.

Southern Pacific Establishes Large Oregon Bus System

THE Southern Pacific established motor coach service on the principal highways in western Oregon on September 20, according to T. B. Wilson, vice-president and manager of the Southern Pacific Motor Transport Co., a Southern Pacific subsidiary. Immediate plans call for the operation of 42 large modern motor coaches, orders for which have been placed. The new lines extend from Portland, Ore., to Salem, Eugene, Roseburg, and Ashland, 332 miles, and from Portland to McMinnville by way of Hillsboro, 52 miles, and to Corvallis by way of Newberg, 87 miles, in addition to interurban service between Portland and Oswego Lake points, 10 miles, aggregating 481 route miles.

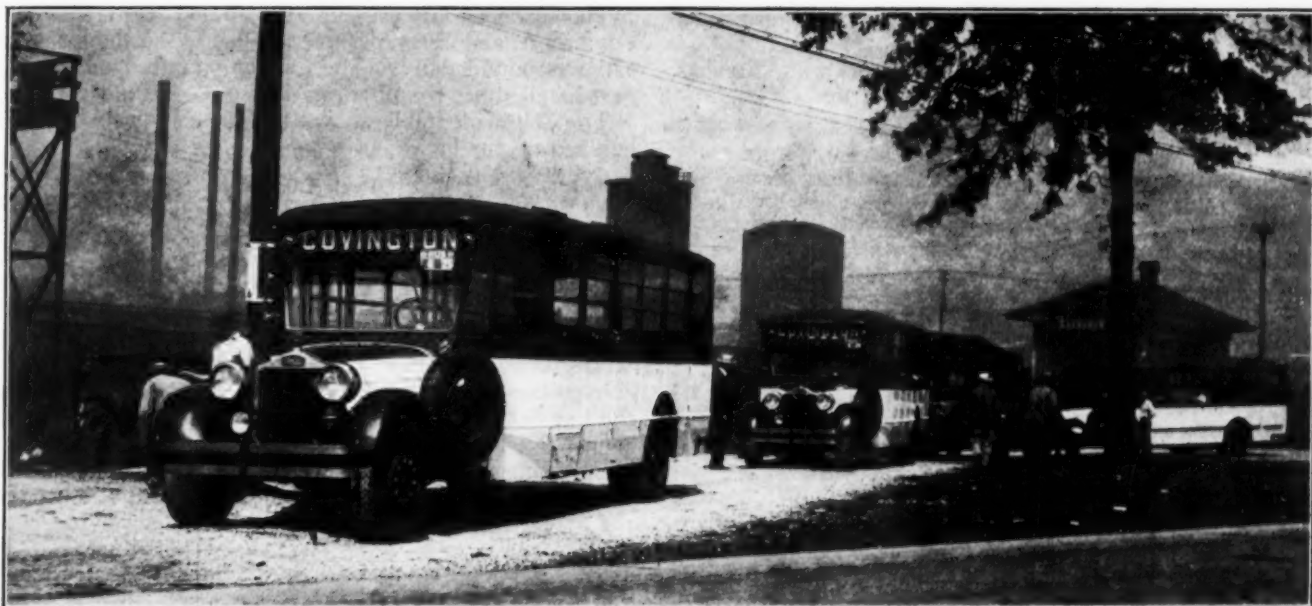
"It is the experience of steam and electric railroads throughout the United States," says a Southern Pacific statement, "that in the interest of greater service to the public as well as more economical operation, it has been found necessary to use motor bus transportation under present conditions as a supplement to rail service."

The local street car lines, operated by the Southern Pacific in Salem and Eugene for many years and which that company has been gradually converting to bus operation, were on August 1, turned over to the Southern Pacific Motor Transport Company.

T. L. Billingsley, who has been superintendent of the Southern Pacific city electric lines in Salem and Eugene for the last fifteen years, has been appointed superintendent for the Southern Pacific Motor Transport Company in Oregon, with headquarters at Salem, Ore.

One round trip daily will be made between Portland and Ashland, another will be made only to Roseburg, two additional runs will be made to Eugene and two more to Salem. Five schedules will be operated each way daily on the Portland-McMinnville route, only one going through, two of the others terminating at Hillsboro and two at Forest Grove. One daily round trip will be made between Portland and Corvallis, and four round trips will be made daily between Portland and Oswego.

Persons holding railway tickets between points served by the buses will have the option of taking either train or bus to their destinations.



The Fleet of Four White Buses at the Stevens Terminal

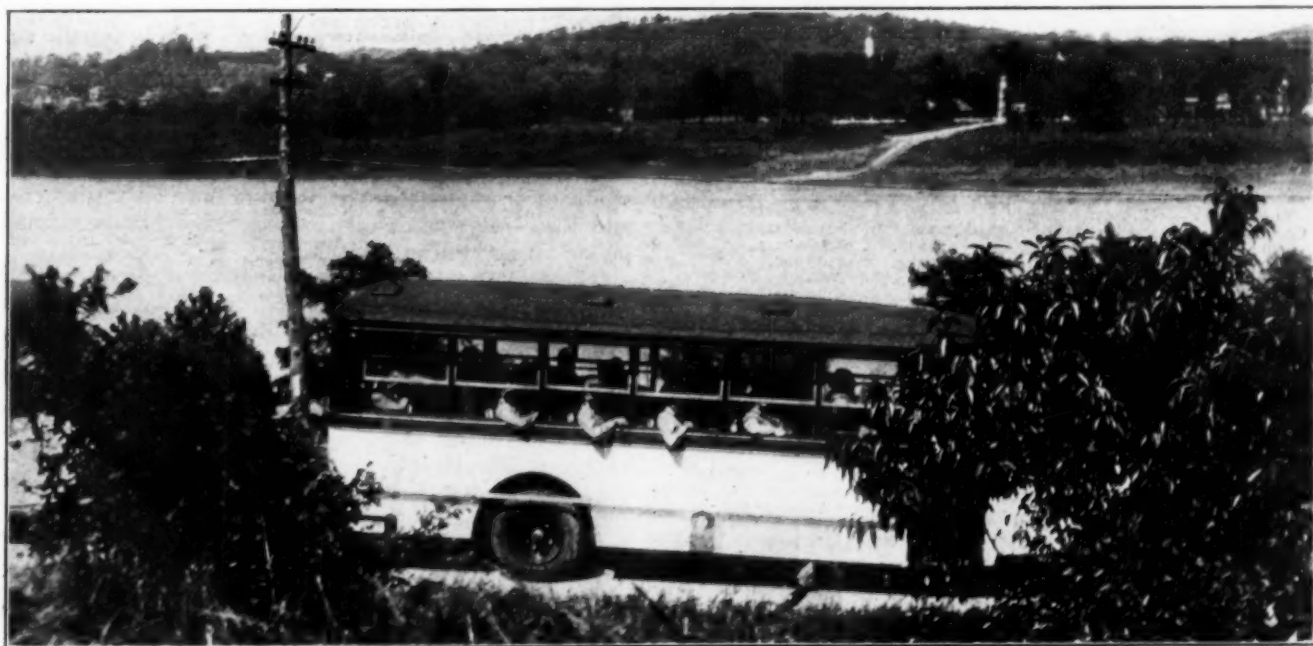
C. & O. Uses Buses to Transport Employees

Contracts for service between Covington, Ky., and Stevens—Four buses operated

ON May 11, 1927, the Chesapeake and Ohio began the operation of a bus line between Covington, Ky., and Stevens, 9.5 miles, for the transportation of employees and their dependents. This service is operated under a contract with a bus transportation company. Twenty-two commuter trains have been discontinued since the bus service was inaugurated, but nearly twice as many schedules are operated with buses.

The Stevens, Ky., terminal was established in 1911,

and it has been necessary to provide suitable transportation to it for employees since most of them live at Covington. This is one of the most important terminals on the system and is the principal engine terminal on the Cincinnati division. Westbound trains are received from Russell for the Chicago division and Cincinnati connections, and trains are received from the Chicago division and Cincinnati connections for the east. There are suitable shop facilities at this point to take care of run-



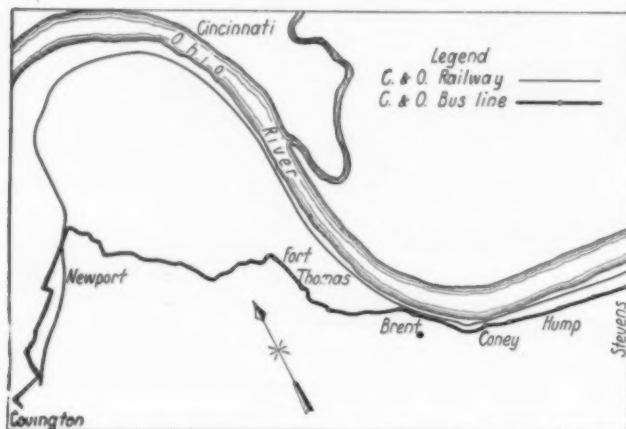
Bus Enroute to Stevens—Ohio River in Background

ning repairs to locomotives and light and heavy repairs to freight cars.

Approximately 475 employees work at Stevens, divided as follows:

Mechanical department	375
Transportation department	100

Most of these employees live at Covington, several live



C. & O. Covington-Stevens Bus and Railway Lines

along the line of the present bus route, and a small number live at Stevens.

Four Buses Operated

Four buses are operated regularly in this service, and additional buses are furnished as needed for capacity business by the transportation company. The buses used were manufactured by the White Company. They are four cylinder, 29 passenger buses and have a pay-enter type of body.

The route covered by the present bus line from Covington to Stevens, Ky., is over an improved road and on a fairly level grade, with the exception of a maximum 6 percent grade crossing Fort Thomas Hill, the slope of which is approximately one mile long on each side of the summit. Stops on the present bus line are made at five points in Covington, at four in Newport, at three in Fort Thomas, and at one each in Brent, Coney, Hump and Stevens.

Prior to the institution of the bus line, commuter train service was used. Twenty-four train schedules were operated daily, only two of which now remain in service. Below are the schedules of the former commuter trains and of the present bus line.

Comparative Train and Bus Schedules

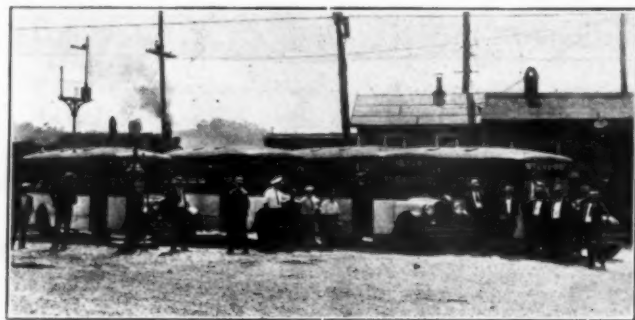
Leave Covington		Leave Stevens	
Former	Present	Former	Present
Commuter	bus and train	Commuter	bus and train
6:20 a.m.	12:01 a.m.	7:30 a.m.	1:10 a.m.
8:20 a.m.	1:00 a.m.	9:10 a.m.	2:00 a.m.
10:00 a.m.	2:00 a.m.	11:10 a.m.	3:00 a.m.
12:01 p.m.	3:00 a.m.	1:10 p.m.	4:00 a.m.
2:15 p.m.	4:00 a.m.	3:30 p.m.	5:00 a.m.
4:20 p.m.	5:00 a.m.	5:10 p.m.	7:00 a.m. (No. 19)
6:00 p.m.	5:30 a.m.	7:00 p.m.	7:15 a.m.
8:00 p.m.	6:20 a.m. (Com.)	9:00 p.m.	7:34 a.m. (No. 5)
10:15 p.m.	6:45 a.m.	11:00 p.m.	7:40 a.m. (2 buses)
12:20 a.m.	7:57 a.m. (No. 8)	1:30 a.m.	9:00 a.m.
2:30 a.m.	8:00 a.m.	3:30 a.m.	10:00 a.m.
4:15 a.m.	9:00 a.m.	5:10 a.m.	11:00 a.m.
.....	10:00 a.m.	.....	12:30 p.m.
.....	11:00 a.m.	.....	1:30 p.m.
.....	12:01 p.m.	.....	3:10 p.m. (2 buses)
.....	2:09 p.m. (No. 2)	.....	3:40 p.m. (Com.)
.....	2:15 p.m. (4 buses)	.....	4:33 p.m. (No. 3)
.....	4:20 p.m. (2 buses)	.....	5:10 p.m. (2 buses)
.....	5:57 p.m. (No. 18)	.....	6:00 p.m.
.....	6:00 p.m.	.....	6:17 p.m. (No. 7)
.....	7:00 p.m.	.....	6:30 p.m.
.....	8:00 p.m.	.....	7:00 p.m.
.....	10:15 p.m. (4 buses)	.....	8:15 p.m.
.....	10:24 p.m. (No. 4)	.....	9:30 p.m.
.....	.....	.....	11:10 p.m. (2 buses)
.....	.....	.....	11:40 p.m. (2 buses)

The number of passengers handled daily between Covington and Stevens averages 460 eastbound and 470 westbound daily. The average number of passengers handled per round-trip is 18.

The following table shows the present peak business handled by the buses:

Peak Loads			
Leaving time	No. of buses required to handle	Leaving time	No. of buses required to handle
Covington to Stevens		Stevens to Covington	
2:15 p.m.	4	7:40 a.m.	2
4:20 p.m.	2	3:10 p.m.	2
10:15 p.m.	4	5:10 p.m.	2
		11:10 p.m.	2
		11:40 p.m.	2

The chief benefit of the removal of trains and the substitution of bus service has been that congestion on the line between Covington and Stevens has been greatly reduced. This line is carrying an increasingly heavy freight business, and the operation of so many commuter trains caused great inconvenience. Through the operation of buses, a more frequent service has been



The C. & O. Bus Fleet at Covington, Ky.

made available for passengers and the railway line has been left much more free to handle freight traffic expeditiously.

B. & M. Compares Bus and Train Operating Costs

FIVE motor buses or two and one-half gasoline rail cars can be operated by a railway for the cost of operating one steam passenger train, according to George Hannauer, president of the Boston & Maine, which recently completed an exhaustive study of the cost of operating these types of equipment. The figures presented are believed to be the first comparable study of train, rail car and motor bus operating costs and their relation to each other which has been made public by any railway.

The Boston & Maine study shows that it cost \$1.589 to operate a steam passenger train one mile, without any charge for roadway or rail maintenance. The cost of a gasoline rail car on the same basis is \$0.72 a mile; and a motor coach operating on the highway cost \$0.289 a mile, according to the experience of the Boston & Maine. In other words on lines where it can meet the relatively light traffic requirements the gasoline rail car cuts steam train costs in half; and in the case of the motor coach, five buses can be operated over the highway for the same amount that it costs to run one train the same distance, without considering the cost of track maintenance.

The Boston & Maine was the first railway in the east to operate motor buses in coordination with its rail ser-

vice, and it probably has the largest fleet of gasoline rail cars of modern type of any American railroad. With the equivalent of 737,767,296 passengers carried one mile on its rails last year, the Boston & Maine has a passenger traffic density which ranks with the highest of the country, while at the same time, it has many lines of light traffic on which it has introduced the newer forms of transportation to reduce costs and to improve service. The Boston & Maine now has 68 buses operating over 1,000 route miles daily and 24 gasoline rail cars operating a total of 2,700 miles a day. The statistics of operating costs are taken from its actual operations.

The following table summarizes the Boston & Maine's experience in the cost of operating steam trains, rail cars and buses:

Cost Per Train Mile (Cents)

	Steam	Rail motor car	Bus
Wages	38.7	23.40	4.574
Fuel	23.7	10.77	3.343
Repairs	50.8	8.33	5.359
Miscellaneous	16.6	1.17	7.171
Depreciation, insurance and interest..	16.5	15.88	7.243
Taxes and fees.....	12.6	12.60	1.265
Total.....	158.9	72.15	28.955

The wage item which, in the case of the two rail services, reflects the increases in wages granted to the several classes of train service employees this year to date, shows the extent to which the gasoline rail car and the bus permit reductions in crew costs. The fuel costs offer a further contrast as between the expenditures for steam and for gasoline operation where light traffic is involved. The item of repairs, which further extends the advantage of the self-propelled vehicle in low maintenance costs, covers work actually performed, 50.8 cents in steam train service including 32.9 cents for locomotive repairs and 17.9 cents for passenger car repairs.

Under "Miscellaneous" are included, in the case of steam trains, supplies, hostling and other engine-house and train expenses not otherwise shown. Under gasoline rail cars similar supply items, heating, lighting, cleaning and hostling, and under buses, garage expenses, lighting, ticket agents, snow removal, etc., are represented. Depreciation of steam trains is charged at a rate of 2 per cent per annum on the investment in cars, and 3 per cent on the investment in locomotives. In the case of gasoline rail cars, depreciation is charged at a rate of 5 per cent on the investment in the car and 12½ per cent on the motor; and on buses, at a rate of 20 per cent per annum.



A Studebaker in Interurban Service

Motor Transport News

THE BUS LINE of the San Luis Central, extending from Monte Vista, Colo., to Center, a distance of forty miles, including the one bus operated, has been sold to the Rio Grande Motor Way, Inc., subsidiary of the Denver & Rio Grande Western, and is now being operated by the latter company.

THE SOUTHERN PACIFIC MOTOR TRANSPORT COMPANY has two applications pending before the California Railroad Commission for the operation of bus lines, one from Colfax, Cal., to Sacramento and the other from Watsonville and Salinas to Santa Cruz. Hearing on these will be held sometime this fall.

N. E. T. Takes Over Additional Lines

The New England Transportation Company, bus operating subsidiary of the New York, New Haven & Hartford, took over the operation of the Winsted-Torrington-Hartford Itinerary Association bus lines on September 1. The association, which had gross receipts totaling \$135,000 last year, has operated lines from Hartford, Conn., to Winsted, Hartford to Torrington via Canton, and Winsted to Canaan. The N. E. T. has also purchased a line operating between Boston and New York.

Wisconsin Bus and Truck Regulation Attacked

A petition to enjoin the Wisconsin Railroad Commission from enforcing the law passed this year, placing the regulation of bus and truck lines in the state under the control of the railroad commission, on the grounds that it is unconstitutional, was recently filed at Madison, Wis., by the Northern Transportation Company, which operates a fleet of motor trucks between Green Bay and Milwaukee as well as a number of other truck lines. The petition was denied by the circuit court.

The Wisconsin bus and truck law was placed in effect on July 11. The action brought by the Northern Transportation Company was its reply to the order of the railroad commission that it apply for a permit to continue operation. The circuit court announced that constitutionality of the regulatory law would be determined this fall.

North Shore Line Makes New Use of Trailers

A new method of handling freight by trailer has been introduced on the Chicago North Shore & Milwaukee between Chicago and Milwaukee, Wis. Freight moves in the trailer directly from the shipper to the consignee without being touched or seen by the carrier. The shipper loads the freight at the factory door and seals the trailer, and it is delivered at the door of the consignee before the seal is broken or the goods handled again.

This door-to-door transfer of merchandise with only two handlings, one at the point of shipment and the other at destination, is made possible by the use of a new type of flatcar and trailer equipment especially built for the North Shore Line. The equipment is different from that used on other railroads in that the metal containers for the freight are permanently mounted on running gear.

When the trailers are loaded and sealed by the shippers, they are coupled to a tractor and drawn to the North Shore Line loading station. There they are run up a ramp on to the flatcar and securely fastened in place by special locking devices without the wheels being removed. On reaching the locality of the consignee, the trailers are unlocked, run down a ramp to the street and hauled by tractor to the point of delivery.

The fact that the containers remain on their wheels at all times results in a large saving of time due to the rapidity with which the containers can be loaded and unloaded. Excellent results are being attained by the North Shore Line in handling large shipments between Chicago and Milwaukee overnight.

Recently more than 500,000 pounds of merchandise was transported by the North Shore Line from Chicago to Milwaukee for a large mail order house which had just opened a retail store in the latter city. The entire shipment was handled in the new flatcar-trailer equipment in a period of little more than one week.

Orders for Equipment

THE NEW ENGLAND TRANSPORTATION COMPANY has ordered from the American Car & Foundry Motors Company 15 Newell type deck-and-a-half parlor coaches.

THE NEW YORK STATE RAILWAYS, subsidiary of the New York Central, has ordered three White model 50-B buses of 25 passengers capacity.

THE MOTOR TRANSPORTATION COMPANY of the South, bus operating subsidiary of the Seaboard Air Line, has accepted delivery of a six-cylinder White bus for operation in the vicinity of Rutherfordton, N. C.

Motor Transport Officers

The following officers of the Union Pacific Stages, Inc., the bus operating subsidiary of the Union Pacific System, have been appointed: **J. P. O'Brien**, general manager of the Oregon-Washington R. R. and Navigation Company, has been appointed also president of the Union Pacific Stages. **A. S. Edmonds**, assistant traffic manager of the railway, has been appointed vice-president of the bus lines. **A. C. Spencer**, general solicitor of the railway, has been appointed secretary of the bus company. **C. W. Miller**, assistant treasurer of the railway, has been appointed treasurer of the bus company. **F. W. Sercombe**, auditor of the railway, has been appointed also auditor of the bus lines. **W. K. Cundiff**, general passenger agent, and **G. H. Robison**, purchasing agent of the railway, hold similar positions in the bus company. **B. C. Wilson** has been appointed general claim agent of the bus company, and **J. W. Marrow**, tax and right-of-way agent of the railway, has been appointed general tax agent of the bus company. All of these officers have headquarters at Portland, Ore. The appointment of **Carl Beach**, as superintendent of the Union Pacific Stages, with headquarters at Pendleton, Ore., was reported in the Motor Transport Section, last month.

N. D. Ballantine, assistant to the president of the Seaboard Air Line, with headquarters at Baltimore, Md., has resigned and has established an office as consulting engineer on railway and motor transport matters, with headquarters in the Transportation building, New York City. Mr. Ballantine was born on March 12, 1872, at Boonville, Mo., and entered railway service in 1886 as a messenger in the telegraph department of the Kansas City, Fort Scott & Memphis (now a part of the St. Louis-San Francisco) and until 1892, served consecutively as clerk, operator, stenographer and electrician on the same road. During 1892 he was ticket agent for the Manitou & Pikes Peak, and from 1893 until 1896, was electrician on the Kansas City, Fort Scott & Memphis. From 1896 until October, 1898, Mr. Ballantine was auditor of the Manitou & Pikes Peak, and from the latter date until July, 1899, was secretary to the general manager of the Kansas City, Pittsburgh & Gulf (now a part of the Kansas City Southern). From July, 1899, until September, 1903, Mr. Ballantine served as superintendent of telegraph of the same road, and was then appointed superintendent of transportation of the Kansas City Southern, which position he held until January 1, 1906. From that date until June 1, 1912, Mr. Ballantine was superintendent of car service of the Chicago, Rock Island & Pacific, and then served as assistant to the second vice-president of the same road until November, 1917. From November, 1917, until January, 1918, he served as major in the Engineering Corps of the United



N. D. Ballantine

States Army, and from January to September, 1918, was a major in the Signal Corps in command of the 416th Railroad Telegraph Battalion. Mr. Ballantine served as general superintendent of transportation of the American Expeditionary Forces from September, 1918, until June, 1919, having been commissioned lieutenant-colonel in April, 1919. On July 1, 1919, he became special assistant manager of the Car Service division of the United States Railroad Administration, which position he held until March 1, 1920. On April 1, 1920, Mr. Ballantine became superintendent of transportation of the Union Pacific, and in March, 1923, became assistant to the president of the Seaboard Air Line, which position he was holding at the time of his resignation to engage in consulting work.

Among the Manufacturers

The North East Electric Company, Rochester, N. Y., will exhibit a complete line of starting, lighting and ignition equipment and horns for motor buses at the A. E. R. A. Convention at Cleveland, Ohio, on October 3-7.

The White Company, Cleveland, Ohio, has opened a new branch sales and service building in Los Angeles, Cal. Four other new service buildings, at the Bronx, New York; Providence, R. I.; Hartford, Conn., and Syracuse, N. Y., are now under construction and will be completed this fall.

The Ohmer Fare Register Company, Dayton, Ohio, has opened branch offices at Detroit, Mich., Philadelphia, Pa., San Francisco, Cal., and Los Angeles. The Detroit branch is in the Insurance Exchange building, the Philadelphia branch at 1635 Vine street, the San Francisco branch at 1428 Brush street, and the Los Angeles branch at 954 South Flower street.

The Ohmer Fare Register Company, Dayton, Ohio, will exhibit fifty-six different types of Ohmer devices at the A. E. R. A. Convention at Cleveland, Ohio, on October 3-7. Among them will be the new Ohmer No. 79, ticket printing register with electric motor drive and printing cash totalizer, with visual indication and cash drawer. A new line of ticket office ticket printing machines will also be exhibited.

Foreign deliveries of White buses and trucks broke all records during July and August when they showed an increase of 107 per cent over the same months of last year. Deliveries in Canada increased 60 per cent. The South African Railways, which operates a large number of buses and trucks, using the latter to make short haul deliveries between points not served by their railway lines, has just ordered eight White trucks.

The White Company, Cleveland, Ohio, will exhibit a complete line of buses and trucks at the A. E. R. A. Convention at Cleveland, Ohio, on October 3-7. The bus exhibit will include the chassis of the Model 54, six-cylinder, 100 horsepower bus, as well as a Model 54 chassis with a 29-passenger parlor car body. Other White buses to be exhibited are two Model 53, four-cylinder buses, one with a 21-passenger street car type body and the other with a 17-passenger chair car body; and a four-cylinder Model 50-B bus with a 29-passenger city type body. Two White trucks will also be shown, one a Model 56, two-ton chassis and the other a Model 51-A, 2½-ton truck.

The International Motor Company, New York, will exhibit seven buses and trucks at the A. E. R. A. Convention at Cleveland, Ohio, on October 3-7. The vehicles displayed will include a 233 inch wheel base, six-cylinder AL model stripped chassis; a four-cylinder, gas-electric drive AB model stripped chassis; a 29-passenger parlor car type mounted on a 233 inch wheel base, six-cylinder chassis; a 29-passenger, six cylinder, gas-electric city type bus; a 29-passenger, four-cylinder city type bus, and an AB model dual reduction, line service and repair truck. The principal feature of the exhibit will be the 29-passenger, six-cylinder city type bus, embodying ample headroom, maximum standing room, low-loading line and passenger safety and comfort.